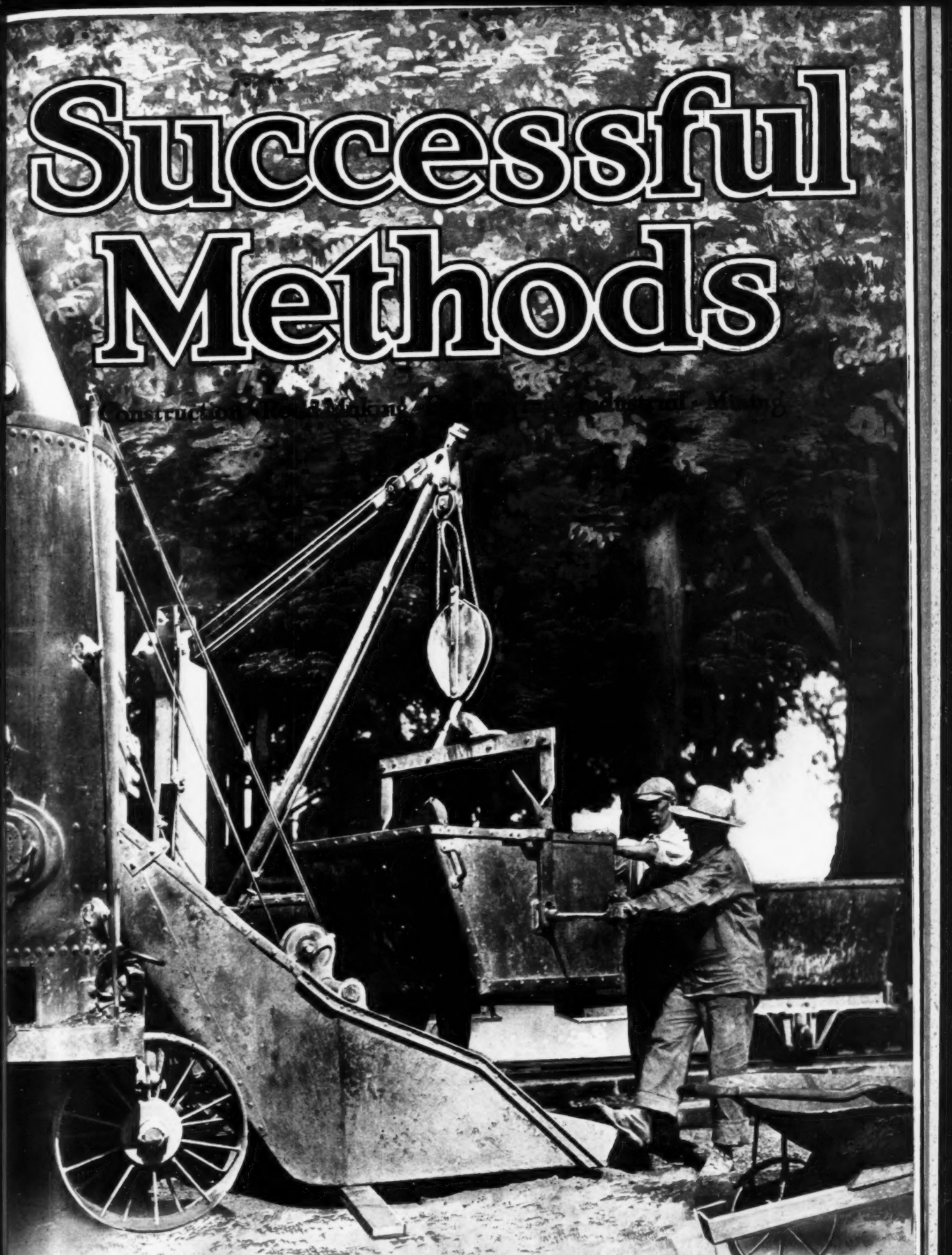
Successful Methods



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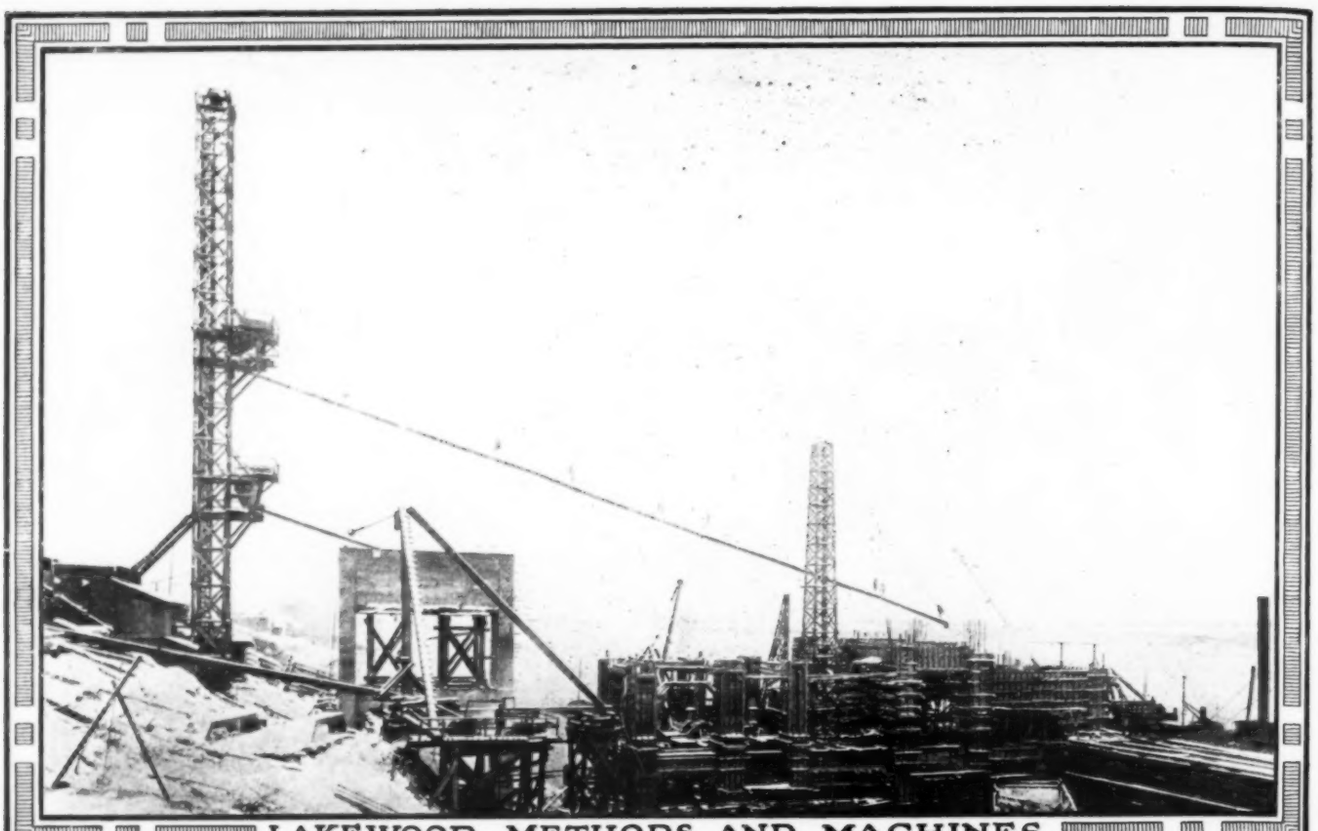


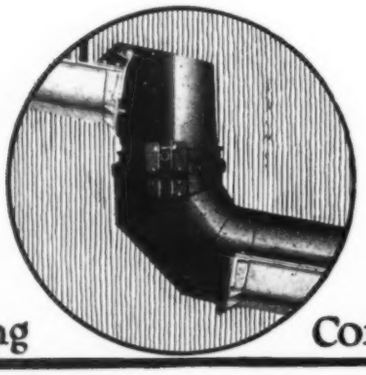
LAKEWOOD METHODS AND MACHINES

This Foundation Company Job Lakewood Equipped

The Foundation Company have a reputation for good work well done. For many years they have used Lakewood equipment on all kinds of construction work.

On the job shown (a coal dock in Ohio) Lakewood chuting carried the concrete from the tower to a line gate over the dock. From there two lines of chute distributed the concrete to the forms.

No job is too big—none too small—for Lakewood plant. The Lakewood line includes everything for mixing and placing concrete.



The Lakewood Engineering Company, Cleveland U.S.A.

Successful Methods

A Magazine of Construction Service

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Vol. III AUGUST, 1921 No. 8

American Builders Overseas

AMERICAN contracting companies have taken on work abroad to a surprising extent in the last year. Two concerns have been doing several good jobs in Peru. Another is erecting large buildings in Japan. Nine or ten big projects have been undertaken in Brazil by half a dozen contractors from here. A New York contractor is building roads in Panama. Various other important works in different parts of the world have been started lately by American companies.

Individual American construction men also have been and are doing good work abroad as foremen, superintendents and engineers. For example, an American superintendent for an Australian contractor recently made what is believed to be the world's record in building concrete grain elevators.

Whether this movement is a permanent trend remains to be seen. There are many serious handicaps to an extension of it. Just as many factors indicate that the amount of construction work done abroad by Americans will increase.

One of the most serious handicaps to an American contractor doing good work in a foreign land is the provincialism of his whole staff, and particularly his home office. His higher-ups are likely to be convinced that American ways only are worthy of their consideration.

Methods of paying for the work offer another new problem that few Americans have yet solved. Financial interests in this country recognize that the United States must put more and more into development work in other lands. The flotation of foreign bonds should, therefore, be easier in the future.

This means that American construction men will get first chance at many big jobs in all parts of the world that are financed by bankers here. It also means that contractors from the United States can realize on good bonds they have to take in payment for work done abroad.

On the favorable side, the economy and speed of American plant and methods are the outstanding feature. Even in the cheapest labor countries of the world it has been demonstrated that our construction machinery and methods get results at less cost and in less time. At present high interest rates, time also is a greater factor than ever before.

Among the other conditions that favor more work being done abroad by Americans, the lure of the frontier is not the least. American construction men will be pioneers in introducing our methods abroad for many years to come, whether it is in the Alps or the Andes. Real men of red blood and plenty of guts will be required to succeed in such pioneer work.

When all is said and done, the situation comes down to what Service said:

> "And I wait for the men who will win me—and
> I will not be won in a day;
> "And I will not be won by weaklings, subtle,
> suave and mild,
> "But by men with the hearts of Vikings, and
> the simple faith of a child;
> "Desperate, strong and resistless, unthrottled
> by fear or defeat,
> "Them will I gild with my treasure, them will I
> glut with my meat."

The Crucial Series

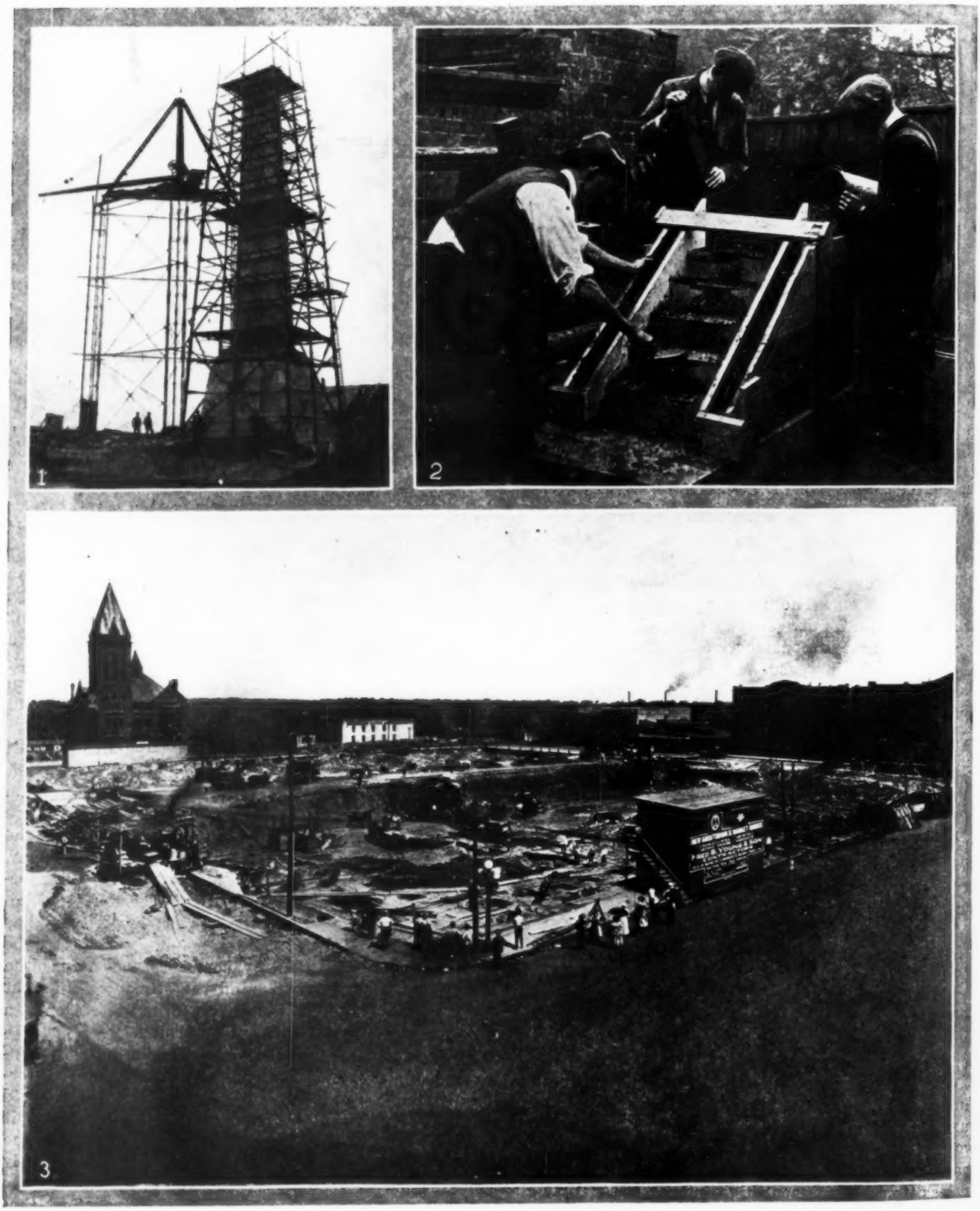
FROM now until the end of the baseball season "crucial series" of games will occur weekly. Newspaper sporting pages will play up luridly how this or that series may mean the championship in a certain league. In some of the leagues the winning teams actually may clinch their leads in the last two or three games. A ninth-inning rally in the final game has been known to do the trick.

It is these driving finishes which help make baseball the great American game. But when it comes right down to cases, a lot of fans wonder why ball-team managers do not make a greater effort to win more mid-season games. After all, a game is a game in the percentage column whether won in July or September.

But the same kind of strategy is used on the average construction job. Along about the first of October the fur begins to fly. All summer everybody has known, of course, where the job is expected to be when snow flies. Suddenly, somebody wakes up to the fact that the work is behind the schedule. In most cases the schedule will be regained, but too often at a cost that cuts the heart out of profits.

Why not check up with the schedule in August instead of October? Probably the material men overestimated their ability to deliver. Some of the old machinery on the job may be nearer all in than it appears, or a little more equipment might be the answer. These and a lot of other things are easily overlooked in keeping the job going. Don't wait to crowd into two or three weeks the extra effort that will be necessary to get done this fall. There will be more profit left if the pace is picked up now instead of putting on a big spurt later.

Keeping Things Moving

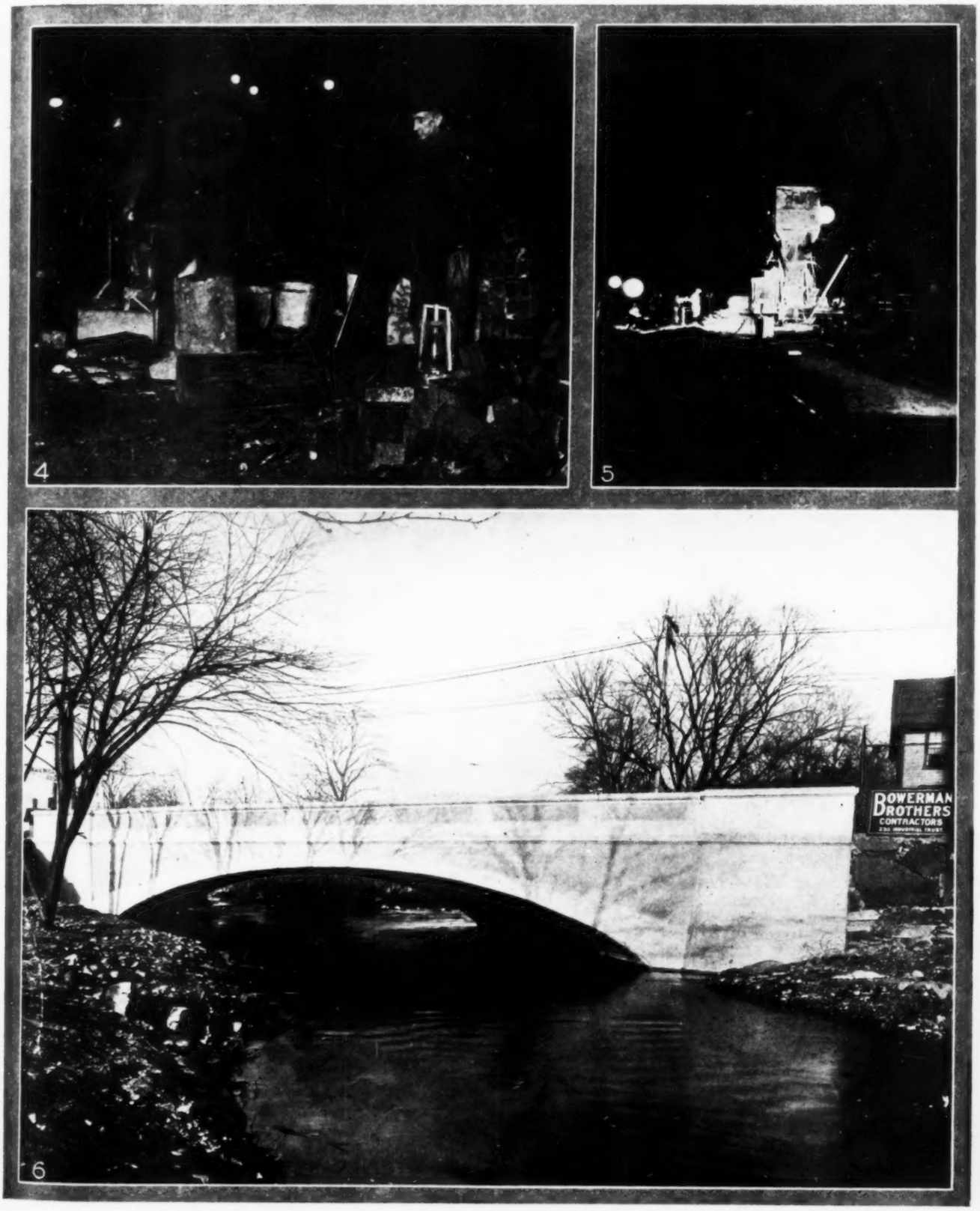


1—Putting up a monument on the Dover cliffs in England in memory of the men who kept the Channel open during the great war. © *Keystone.*

2—In Pratt Institute, Brooklyn, the students learn the construction business from the ground up.

3—The South is holding up its end in the revival of construction. This photograph shows the foundation work in progress for the Municipal Auditorium and Market House in Memphis. The contractors are Fred B. Young & Son.

In the Construction Field



4—As the average construction job looks at night. Nobody in sight but the more or less faithful watchman. © *International*

5—As the big Twohy Brothers road job in Maricopa County, Arizona, looks at night. Work keeps right on through the darkness.

6—A new highway bridge in New England. Built at Centredale, R. I., for the State Board of Public Roads, by Bowerman Brothers of Providence.

AIDING AKRON'S GROWTH

New Viaduct Will Permit Ohio City to Spread Out on South Side

By Thomas Oseth

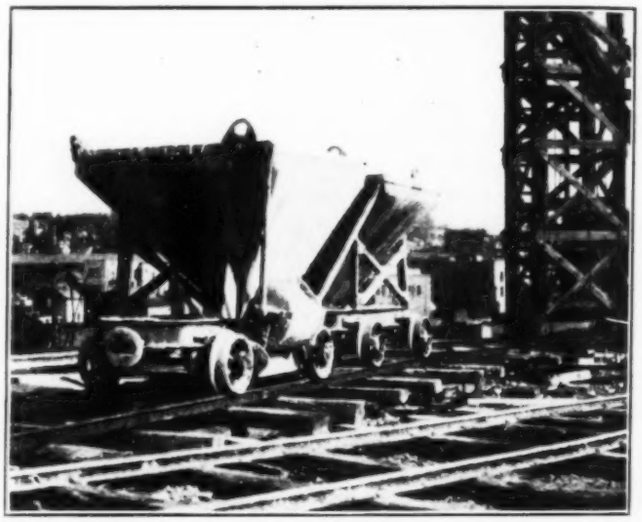
AKRON, OHIO, is a city that has made phenomenal progress in the last few years. This growth brought Main Street to an abrupt termination on the south side at the Cuyahoga Valley, which is about a half mile wide and 200 ft. deep. Although this gorge-like scenery is picturesque, it presented topographical

REMOVING THE ARCH STEEL CENTERING USED TO SUPPORT THE FORMS.

stumbling blocks to the city's growth. The County Commissioners, after much study, decided to span the valley with a concrete arched viaduct, and after plans were completed by Harrington, Howard & Ash of Kansas City, the contract was let to the James O. Heyworth Co. of Chicago in the early part of 1919. Considerable time was required to make the necessary right-of-way negotiations and clear the site, so that it was well along in the summer of 1919 when the contractor was able to begin actual work on the job.

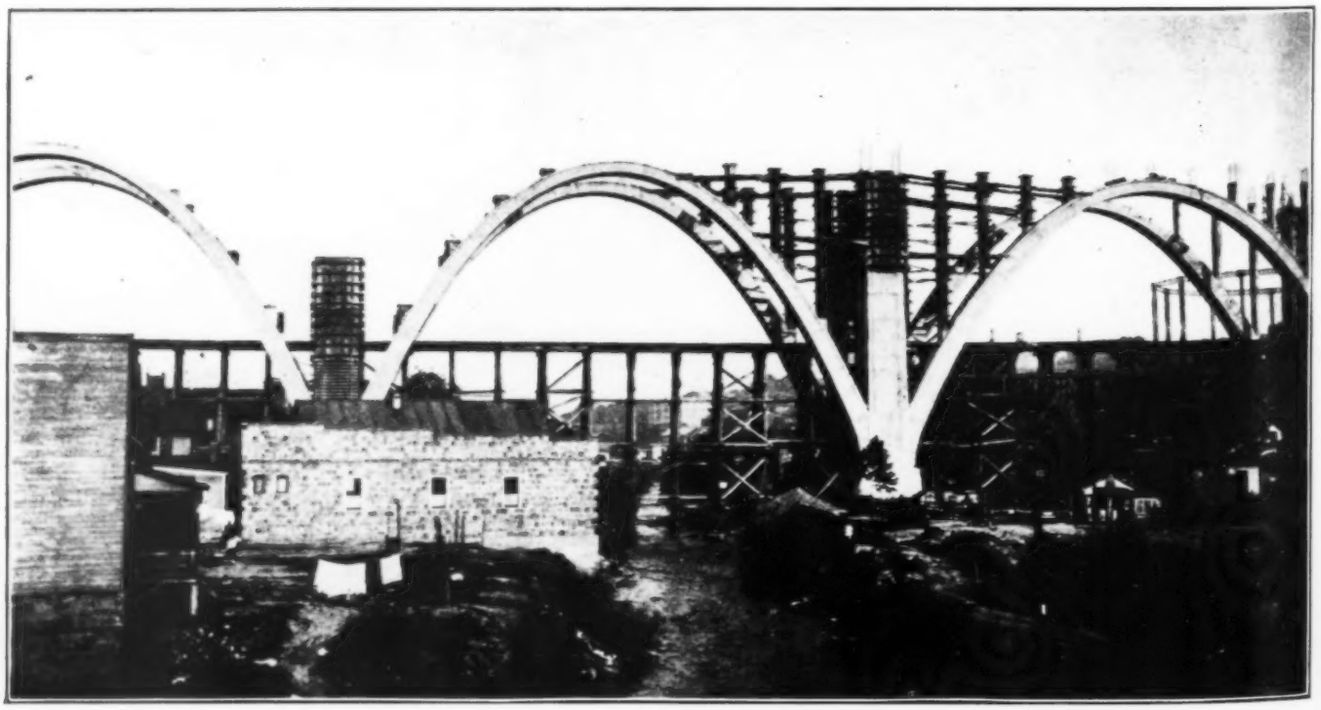
The structure is 2789 ft. from face to face of abutments. The river or longest span is 191 ft. and the greatest rise or height is about 175 ft. The deck carries a 52-ft. roadway and two 10-ft. sidewalk spans, making a total width of 72 ft. The various illustrations show the gigantic proportions and general characteristics of the design.

For use during construction it was decided to build



THE SMALL CARS USED TO CARRY THE CONCRETE.

a temporary trestle practically the entire length down the center between the two main arches to carry both



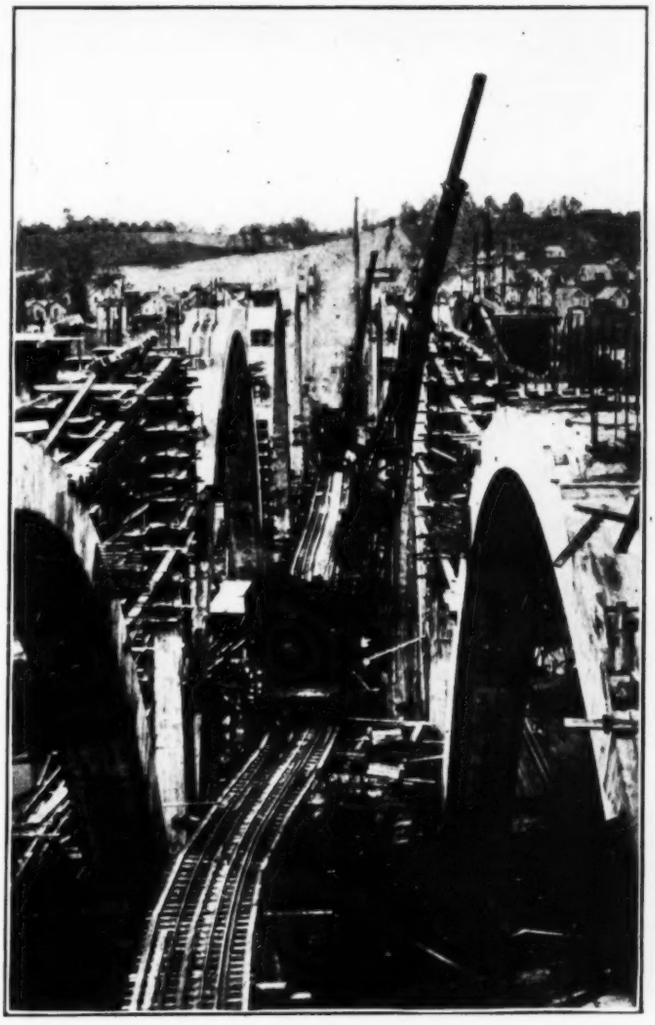
A GENERAL VIEW SHOWING THREE OF THE ARCHES.

standard and 30-in. gage tracks. The trestle, which may be seen in the illustrations, connects on the south end with the Baltimore & Ohio Railway. The standard gage tracks are for the locomotive cranes, while the industrial tracks carry 1-yd. bottom-dump cars drawn by gasoline locomotives which handle concrete from a central mixing plant.

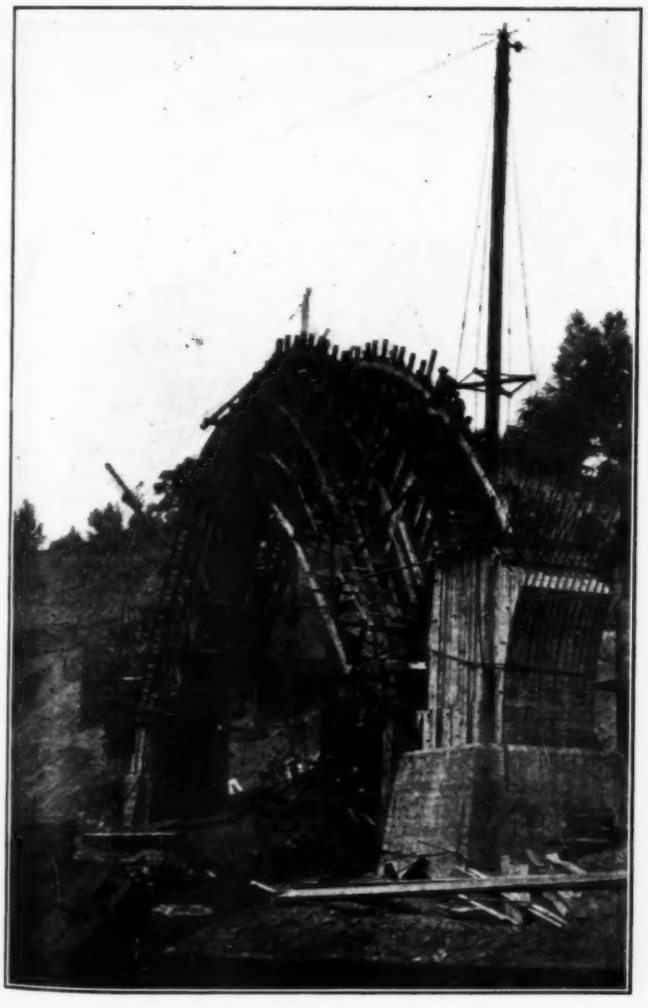
Slag from Pittsburgh and sand from Akron are received in bottom-dump cars and dumped directly into bins from which they are chuted into a 1-yd. mixer. An electrically driven hoist operates a wooden tower by means of which concrete is delivered to cars on the trestle or to the deck of the viaduct as desired.

After concrete foundation piles were driven to a 30-ft. penetration, footing concrete was carried out over the trestle in the 1-yd. cars and chuted to place. For the main arches the car bodies were handled as a skip by guy derricks or locomotive cranes and the concrete placed in the forms. To support the forms for the main arches three-hinged arch steel centering is used and the units are set in place by the guy derricks. The centering is made in sections and they are bolted after erection. The columns for supporting the deck are built with wood forms having steel bracing. Concreting the columns is done in the same way as the arches.

The manner in which the forms are handled and supported and the concreting is done for the deck, is one of the prettiest operations of the entire job. Steel brackets are placed on the concrete columns with the locomotive crane and made fast with 3-in. bolts. From the upper part of the brackets the steel truss or centering for the floor beams and slab is supported, while from the bottom of the same brackets a timber which carries a track for a steel traveler is hung. The traveler, which is propelled by a gasoline motor, is low enough to clear the steel supports for the forms and is used to transport the forms and their supports ahead as needed.



THE TRESTLE BETWEEN THE ARCHES USED DURING CONSTRUCTION.

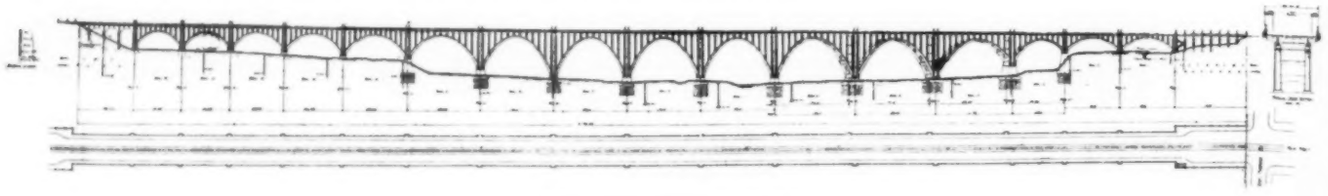


PREPARING THE FORMS FOR ONE OF THE BIG ARCHES.

In other words, no falsework is used for the deck, all forms being hung from brackets which are placed on the columns by the crane in advance.. Two small derricks on top handle the cantilevered sidewalk forms, which are supported on the same brackets. The concreting of the deck is divided into three operations: First, a section, full width of the deck at the center of the span, is poured, then two sections over the piers, and, finally, the two remaining sections are filled in. About 400 cu. yd., or 67 lin. ft. of deck are poured in a day.

In addition to the plant described, 5 guy-line derricks and 3 locomotive cranes are used. All reinforcing steel, of which there are about 1000 tons, is bent on the job by means of an electric bending machine. The total amount of concrete is about 46,000 cu. yd.

The total force consists of about 240 men, including riggers, carpenters, steel workers, concrete men and a few laborers. The viaduct will be ready for the commissioners to turn over to the public in the summer of 1922. The members of the Board of County Commissioners are John C. Mentzer, August C. Miller and John Ripley. The county engineer is Charles J. Costigan. The James O. Heyworth organization of Chicago, Thomas Oseth, superintendent, is building the viaduct.



SPEED AND ACCURACY WITH A POWER SHOVEL

Contractor on Reservoir Job in Ohio Is Making Good Record

A JOB on which good speed is being made by a power shovel is the waterworks project at Wauseon, Ohio. Hedden & Sons of Willard, Ohio, are the contractors. The work consists of moving about 85,000 cu. yd. of material in order to make a retaining basin which will cover from sixteen to eighteen acres.

The photograph at the bottom of the page shows one of the shovels owned by Hadden & Sons digging a ditch which is to form a waterway around the property. This waterway will extend around three sides and the water from the present creek channel will be diverted into it. It is 8 ft. wide at the bottom, 13 ft. 6 in. deep, and has a side slope of 1½ to 1.

When the work began the shovel went the entire length of the ditch, using a 14-ft. stick and cutting to an average depth of 10 ft. All the dirt was loaded on top of the bank on dump wagons. When the end of the ditch was reached, the shovel was turned around and started back, this time using a 24-ft. stick and working on an improvised platform composed of 8 x 8 railroad ties, on which the mats were placed. The platform elevated the shovel about 2 ft. and made it possible to continue loading wagons on top of the bank. The shovel was handled so accurately that the cut and slope were finished without any hand dressing.

Both contractor and operator are proud of the speed made on this work, for 900 yd. of material were handled in a 10-hour day, and at one point the operator was timed and it was found that it was loading 88 wagons of 2¾-yd. dipper capacity in an hour. Another shovel is now on the job, and the two will work together in excavating the retaining basin.

HANDLING GRAVEL ECONOMICALLY

Plant at Knoxville, Tenn., Makes Full Use of Machinery

By W. C. Champion

A STUDY of the arrangement of the material handling equipment at the plant of the Kinzel-Thompson Sand & Gravel Co., Knoxville, Tenn., of which F. L. Conner is president, is worth the consideration of the sand and gravel producer as it is one of the best plants of its kind in the country. A few points concerning the cycle of operation will be of interest.

A VIEW OF THE THOMPSON PLANT WHICH SHOWS THE CONVEYOR SYSTEM

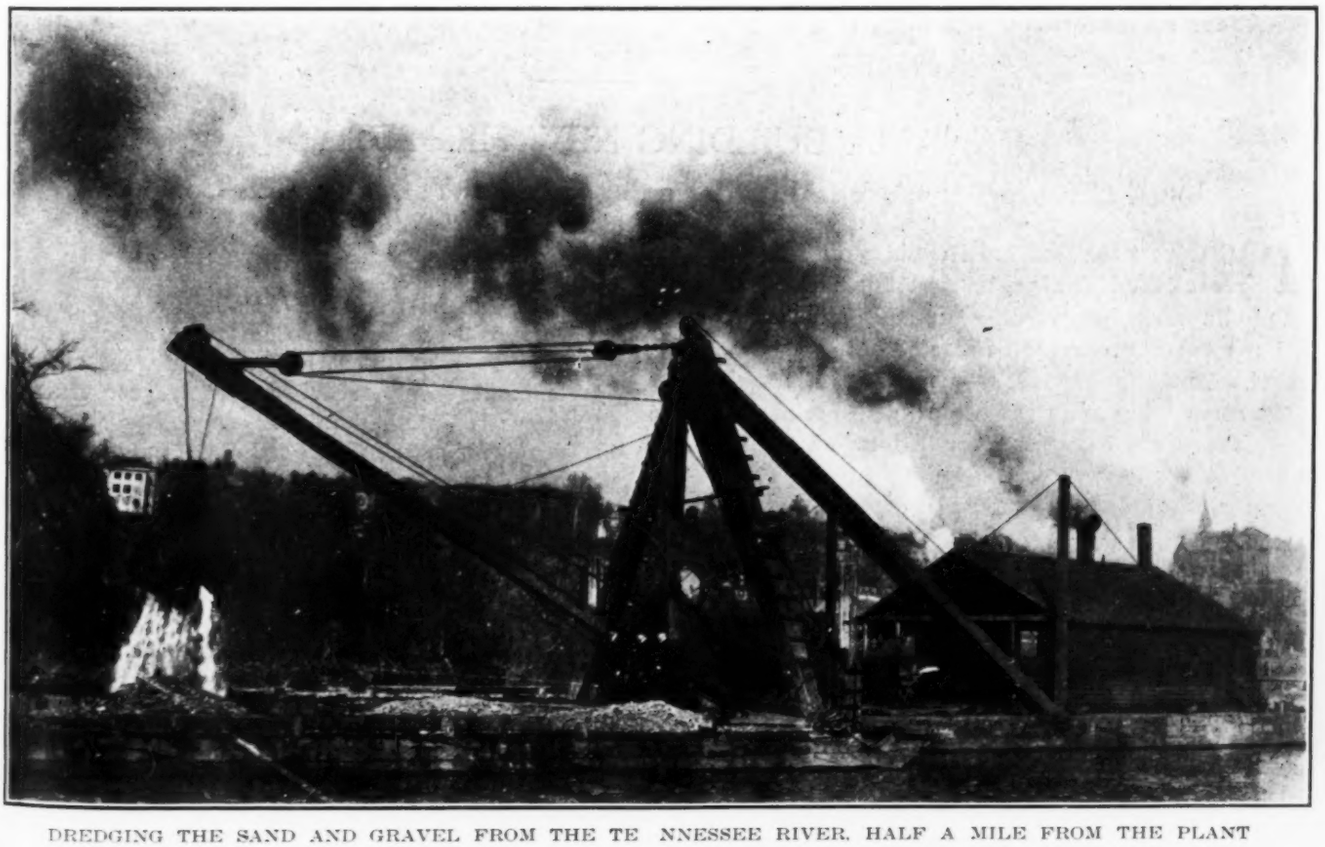
A 16-in. barge derrick, with clamshell bucket, dredges the material in the Tennessee River, about half a mile above the dock. It is loaded on barges and floated to the unloading dock. At this point it is transferred from the barges to a hopper by a stationary, steam-operated, stiff-leg derrick and clamshell bucket, and from the hopper carried by belt conveyor to the top of the washing bin.

A stream of water forces it from the bin down an incline into a 2-in.-opening conical screen, where all stone larger than 2 in. is sorted out and chuted directly to the crusher. The crushed stone is then elevated back to the head of the screen and follows the regular system of screening.

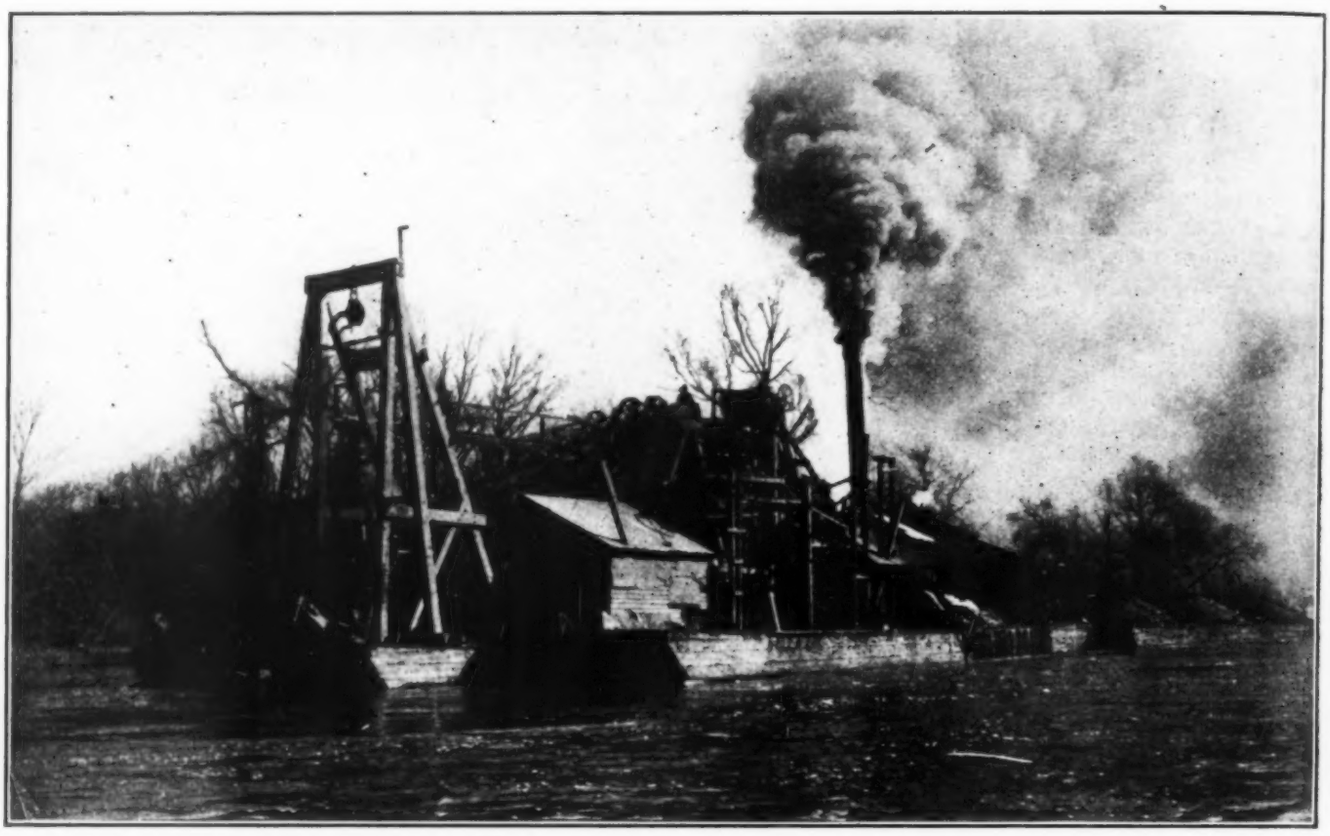
Three sizes of stone are produced: 2 in. down to 1½ in.; 1½ in. down to ⅞ in.; and ⅞ in. down to ¼ in.; and also three grades of sand, a coarse concrete sand, a brick sand and a fine asphalt sand.

As the coarse sand passes through the chutes it goes through the screen into an automatic tripper and the fine sand passes on to settling bins, which take out the medium sand. The overflow of this bin goes on to another settling bin of larger capacity, where the fine sand and silt are separated. The washing bins proper hold from 250 to 300 tons each and as a surplus of material is obtained there, it is carried by belt conveyor to a storage pile having a capacity for storage of 52,000 cu. yd.

Underneath the storage pile is a tunnel equipped with a belt conveyor with numerous openings on the top of the tunnel underneath the stored materials. The material is reclaimed from the storage pile and



DREDGING THE SAND AND GRAVEL FROM THE TE NNESSEE RIVER, HALF A MILE FROM THE PLANT



A VIEW OF THE PLANT FROM THE RIVER, SHOWING THE UNLOADING EQUIPMENT.

conveyed to street cars or railroad loading bins, as the plant is served by both types of transportation. Underneath and at the sides of the bins are openings for loading trucks. This method of storage eliminates all possible congestion.

A 75-ton scale erected at a strategical point permits of the weighing of street cars as well as of trucks.

The plant and equipment cost about $150,000 to construct. The rated daily capacity is 1000 tons. The machinery is electrically driven, each unit being handled by a separate motor. The barge derrick and stationary unloading derrick are operated by steam.

PANAMA BUILDING NEW HIGHWAYS

Actual Construction Work Is Just Beginning and New York Firm Gets Contracts

THE Government of the Republic of Panama has recently undertaken its first important program of public works by awarding two contracts for modern highway construction to be carried out in the interior of the Republic. In 1918 by special legislation the Government began to set aside in a special fund 75 per cent of the national revenue remaining after the payment of all expenses of administration. This fund is only available for highway construction.

At this time the fund has reached the sum of $2,500,000 and is accruing at the rate of $1,300,000 per annum. By special executive decree a body known as the Junta de Caminos was named by the President of the Republic and authorized to award contracts and, through its chief engineer, to supervise the expenditure of the funds in hand and accruing. The Government of Panama requested tenders for the highway construction in January of 1921, the proposed work having been divided into two divisions of 135 kilometers each. Bids were requested on a basis of cost plus a percentage.

The low bidders were R. W. Hebard & Co., Inc., of New York, and the Panama Construction Co., a local concern at Panama. Contracts were awarded to these two companies in February and active construction operations are just beginning.

The contract of R. W. Hebard & Co. is in the Province of Cocle and that of the Panama Construction Co. in the Provinces of Los Santos and Herrera, the three provinces being located about 125 miles west of the isthmus on the Pacific Coast. It is the present intention of the Government of Panama to build macadam roads although later recommendations may change this to macadam and asphalt.

J. W. Beardsley, former Director of Public Works in the Philippine Islands, is chief engineer and executive officer for the Junta de Caminos and will direct the work. The present program of road construction as contracted calls for an expenditure of some $7,000,000 U. S. currency.

COALING A STEAMER WITH PORTABLE CONVEYORS

BY using portable belt conveyors the Tampa Coal Company has achieved mechanical coaling of ships at its dock in Tampa at low first cost of machinery — especially as compared with the other mechanical means of coaling ships now common—low upkeep cost and considerable capacity.

COALING AT RATE OF 400 TONS PER DAY

With the conveyor shown in the photograph a steamer is coaled at the rate of 400 tons a day. Usually the coal is taken from the storage pile, shown on the dock, in wheelbarrows having a capacity of 500 pounds each. The wheelbarrows are counted, and the amount of coal taken on can be checked by the ship's scales.

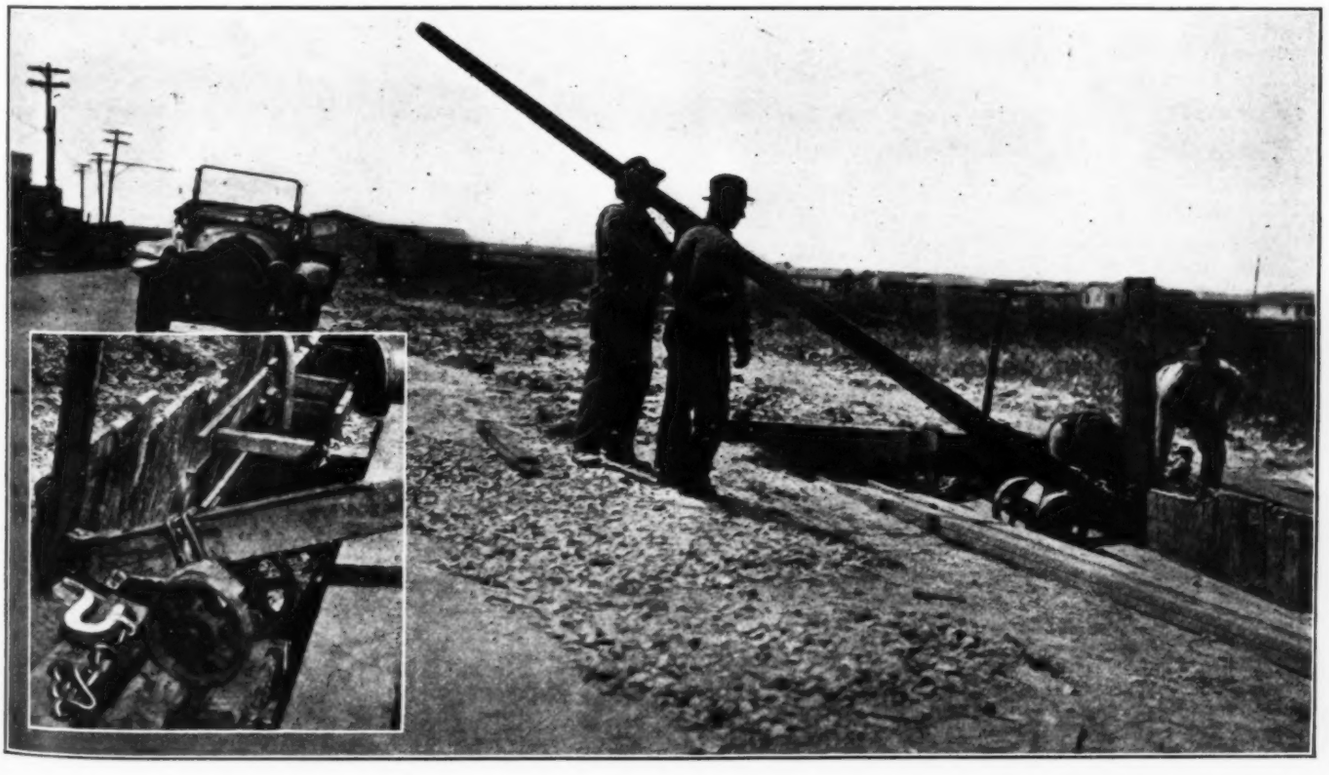
Sometimes railroad cars of coal come in on the track at the same time a ship docks to be coaled. Then the process is simplified. A second conveyor takes the coal from the car, discharges to the inclined conveyor, and the coal is put aboard at the minimum expense in time and labor. Each carload also furnishes as accurate a check of the weight as do the wheelbarrow loads.

The storage pile is built up by the conveyors. When cars are on the switch, and there are no ships to be coaled, the conveyors take the coal from the cars and pile it on the docks to the height shown.

Ships can be coaled by machinery much faster than by the hand method, and practically all labor charges eliminated. Then, too, no hand method has yet been employed by which the coal was not spread all over the ship. Coal dust is penetrating and entails an endless amount of drudgery before the ship can be cleaned after coaling. Mechanical loading has everything in its favor as far as cleanliness and convenience are concerned.

A CLEVER RIG FOR PULLING SHEATHING

JOSEPH JOHNSON SONS CO. of West New Brighton, Staten Island, has a sewer job of considerable magnitude under way at the present time. Among the equipment which they have, which includes trenching machines, gasoline pumps, steam shovels, etc., is a home-made rig used to pull sheathing. It is shown in the photograph. This rig consists of a pair of old wheels to which is clamped a long pole for a lever. A piece of wrought iron, bent so as to grip a 2-in. plank, as shown in the insert, is made fast to the lever by means of a chain, and the sheathing is pulled easily, as illustrated. In this way sheathing may be reclaimed with a minimum of trouble and damage to the planks.



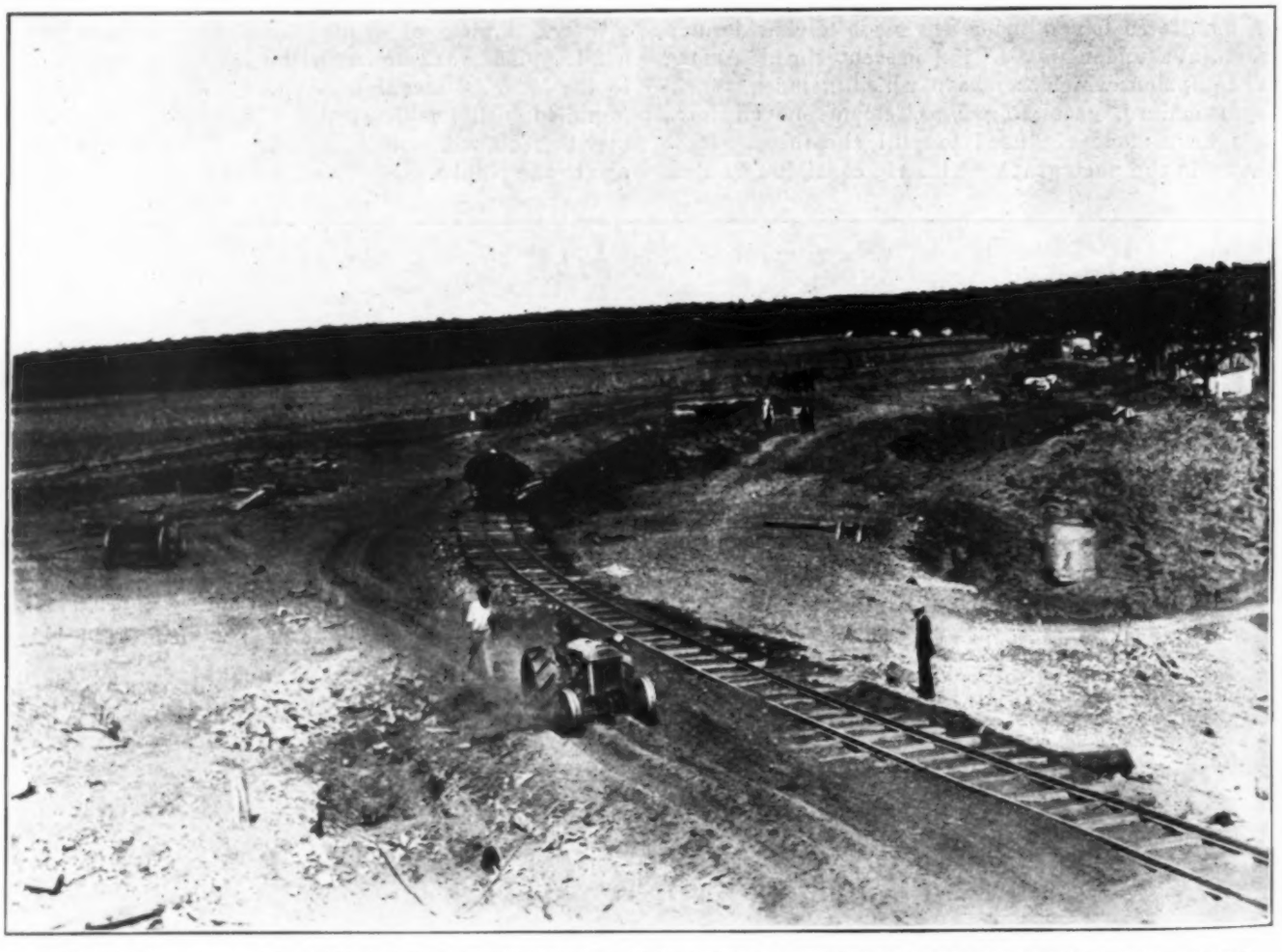
FILLING UP A WASHOUT

Dump Cars Succeed Where Wagons Fail on Emergency Job in Texas

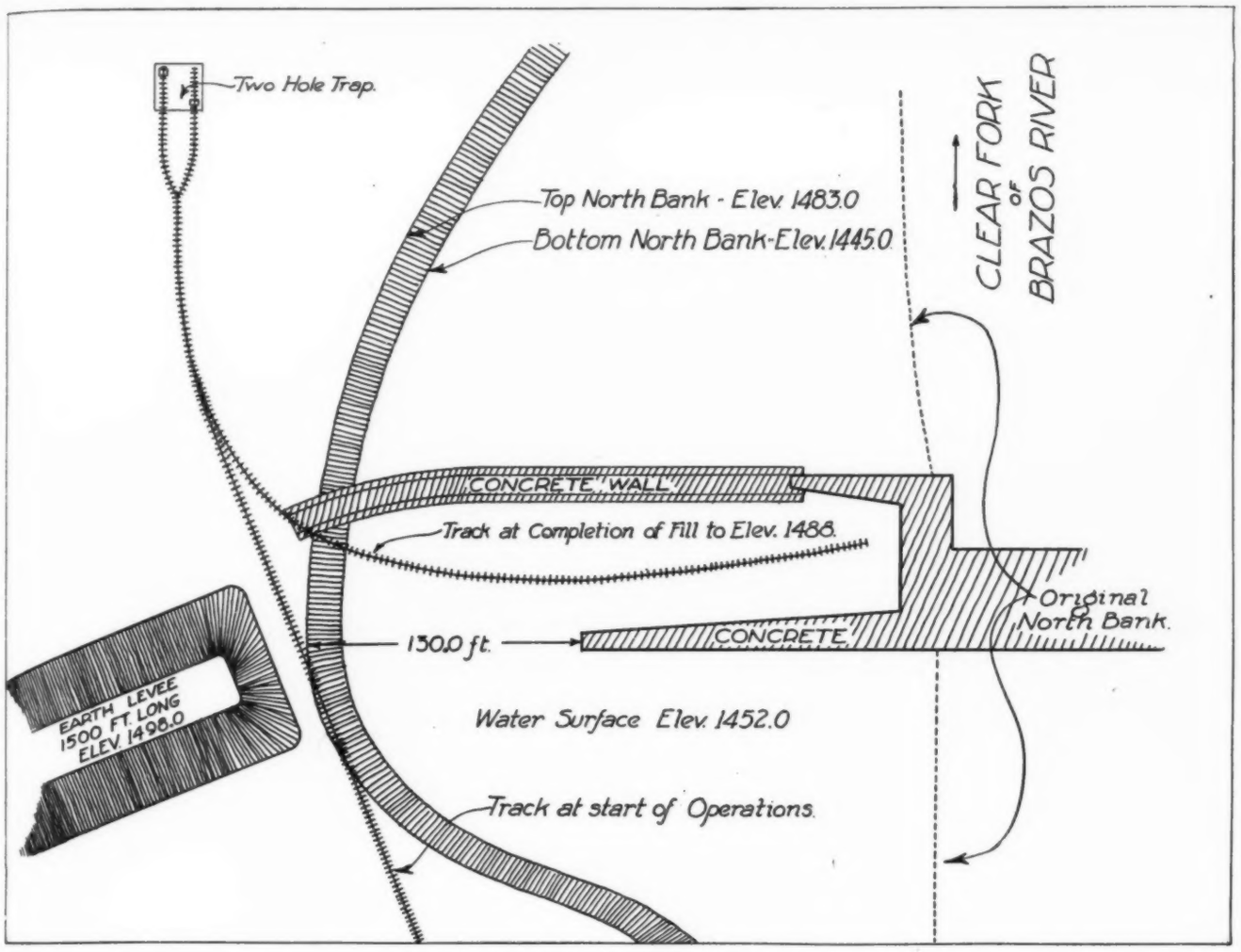
IT often takes time to find the right method for a construction job and a fill that W. A. Keene of Kansas City, Mo., has just finished for the city of Stamford, Texas, is a good illustration of that fact. A dam being built for the city got into difficulty when a rise in a fork of the Brazos River washed out a gap some 130 ft. in width around the end of the dam. This made it necessary to close the gap by filling it with some 25,000 cu. yd. of earth.

BRINGING THE FILL CLOSE TO THE CONCRETE RETAINING WALL.

At first, attempts were made to do the work with teams and some $30,000 were spent in an effort to accomplish it in this way. It proved, however, extremely difficult to work wagons over the material that had to be dumped into the water and the task of getting them up and down the almost vertical 35-ft. bank by means of runways added greatly to the expense. The varying stages of the river also made trouble. After it became evident that the use of teams was not satisfactory, it was decided to put dump cars on the job. First, however, a concrete retaining wall was built across the gap and this not only simplified the work but did away with a great part of the flood risk. The diagram on the opposite page shows how the work finally was done. Four-yard, 36-in. gage dump cars were loaded through a trap by four fresnos working in two 10-hour shifts. The trap pit was excavated to about 8 ft. below the original level of the borrow pit and the trap itself



PULLING THE DUMP CARS UP A 3 PER CENT GRADE WITH A SMALL TRACTOR RUNNING BESIDE THE TRACK


Two Hole Trap.
Top North Bank - Elev. 1483.0
Bottom North Bank-Elev. 1445.0
CLEAR FORK of BRAZOS RIVER
CONCRETE WALL
Track at Completion of Fill to Elev. 1486.
Original North Bank.
130.0 ft.
CONCRETE
EARTH LEVEE 1500 FT. LONG ELEV. 1498.0
Water Surface Elev. 1452.0
Track at start of Operations.

A PLAN OF THE JOB

placed at the ground level to avoid any climb at the early stage of the work.

A small tractor using a 100-ft. length of ¾-in. cable pulled the cars up a 3 per cent grade to the dump, the cars returning by gravity to the loading pit, dragging the cable. At the pit the "spotter" transferred the cable to the waiting car that had been loaded while the first was being dumped. The tractor did not go into the trap pit, but pulled from the level of the original ground surface. During the month of May 5751 of these cars loaded well beyond their four-yard dimensions were hauled by this method.

For the haul and dump (625 ft. from the trap to the mass center of the fill) the expense per shift was $27.56, of this $25 was labor on cars and dump, and $2.56 for fuel and oil. No allowance is here made for depreciation. This figures an expense per yard moved of $.069. The average was 400 cu. yd. per shift, or 100 cars.

The only trestling necessary was a short "tail" track when it became necessary to pass the high wall. At this point two 30-ft. sticks and two 8-in. x 16-in. 32-ft. stringers were used.

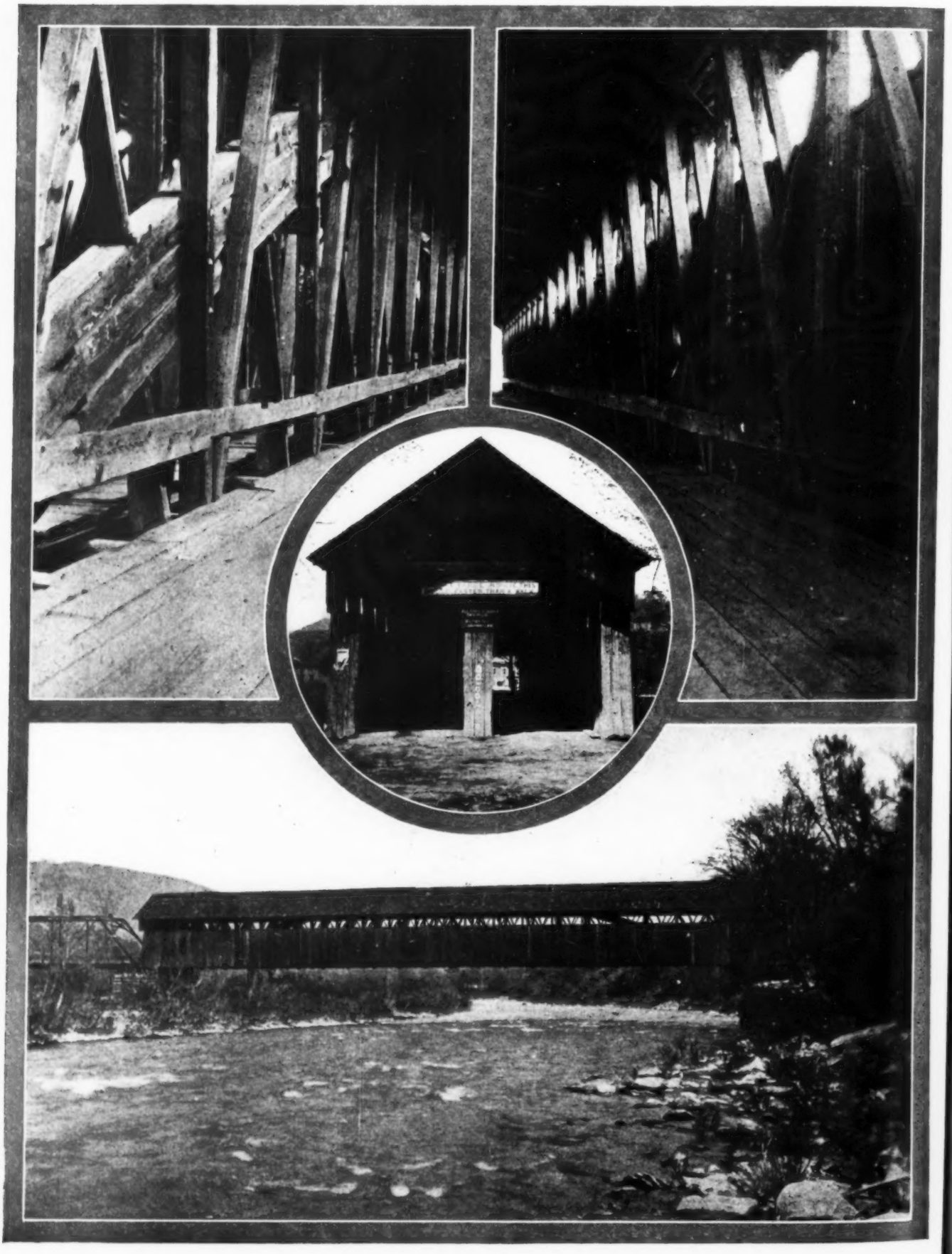
The tractor never burned more than 13 gal. of kerosene (at 13 cents per gallon) on a ten-hour shift. The lubricating oil expense was high, as the crankcase was completely drained and refilled with fresh oil every second shift. This may have been a needless precaution, but it eliminated all bearing trouble. This tractor worked 20 hours every day, and from May 19 to June 1 did not lose an hour, its only cooling-off period being during the meal hours of the drivers.

Pennsylvania Highway Department Is Looking Ahead

AN example of the foresight with which the Pennsylvania Highway Department is doing its work is furnished by a statement of some of the department's plans which was issued recently. Realizing that the time to make plans is before trouble arises, Commissioner Lewis S. Sadler asked the legislature to give his department authority to extend the width of important highways.

No attempt will be made at this time to widen these roads, but surveys will be made at once to determine the probable amount of future traffic and everything will be in readiness to widen the thoroughfares in plenty of time to accommodate the increasing traffic. For example, sufficient notice will be given so that property owners will not erect buildings too close to highways which are to be widened.

AN OLD-TIME LONG SPAN TIMBER BRIDGE



BUILT IN 1835, IT IS STILL ON THE JOB

IN the Catskill Mountains, six miles to the north of the site of the Gilboa Dam project, in Schoharie County, New York, and spanning the Schoharie Creek, stands what is thought to be the longest single span wooden arch bridge in the country. Several photographs of this bridge are shown on the opposite page.

The bridge was built under the direction of Nicholas Powers, a resident of Vermont, and a well-known builder of wooden bridges, in 1835, and a careful inspection recently made revealed the fact that all of the timbers still were in very good condition.

The timbers consist of native pine and were hewn and framed in the woods on the mountain side, about a quarter of a mile from the site. It has a clear span of 232 ft. and a width over all of 26 ft. The arch through the center divides the traffic, making two single roadways of 10½ ft. each. The construction details consist of a series of lattice wooden trusses carried by the wooden arch in the center, which is clearly shown in the photographs.

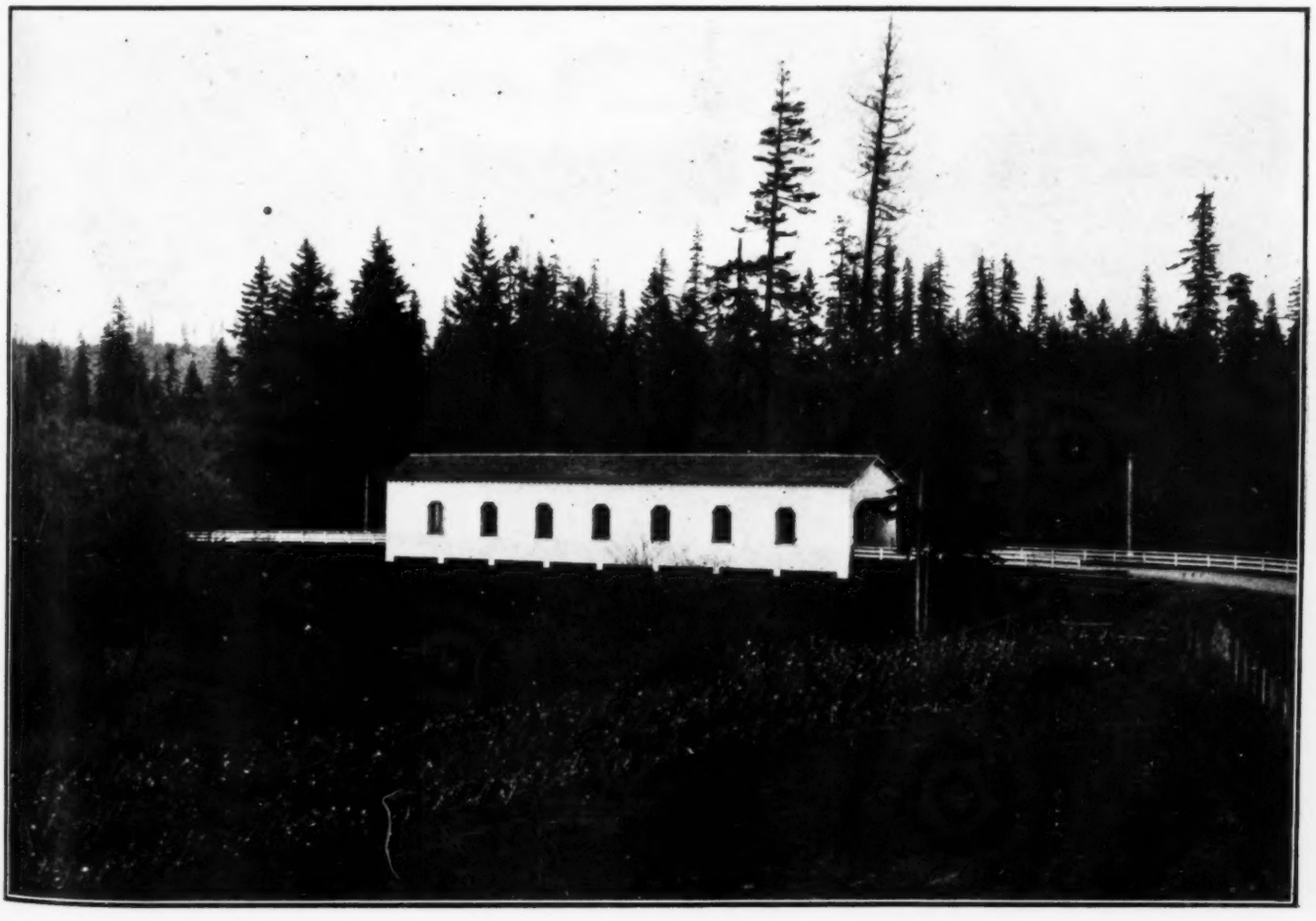
This bridge has faithfully survived all the floods for which the Schoharie Creek is famous, the highest water record being in 1888, when the floor of the bridge was covered to a depth of 20 in. At this time the approach on the west side was carried away and was replaced by a 60-ft. steel truss, but the main structure remained intact. The bridge was built at a total cost of about $6,000.

THE MODERN VERSION OF THE COVERED BRIDGE

Oregon Highway Department Saves Money by Building Timber Structures

OUT in Oregon the covered wooden bridge is by no means considered a back number. Timber is extremely plentiful in that State, especially in the part west of the mountains, and timber construction is, therefore, comparatively cheap when compared with concrete or steel. The photograph at the bottom of this page shows a 160-ft. wooden bridge built by the State Highway Commission on the West Side Highway in Washington County.

This bridge is of a standard type adopted by the department. The old covered type was selected because the cover costs about 10 per cent of the cost of the truss and increases its life from 100 per cent to 200 per cent.



IMPROVING CHICAGO'S DRAINAGE SYSTEM

Well Planned Chuting Layout in Use on New Sewage Treatment Works

By E. W. Cox

AMONG the many vast projects which come under the jurisdiction of the Sanitary District of Chicago, and part of the Calumet Intercepting Sewer System, is the $4,500,000 sewage treatment works now being built by the T. J. Forschner Contracting Co.

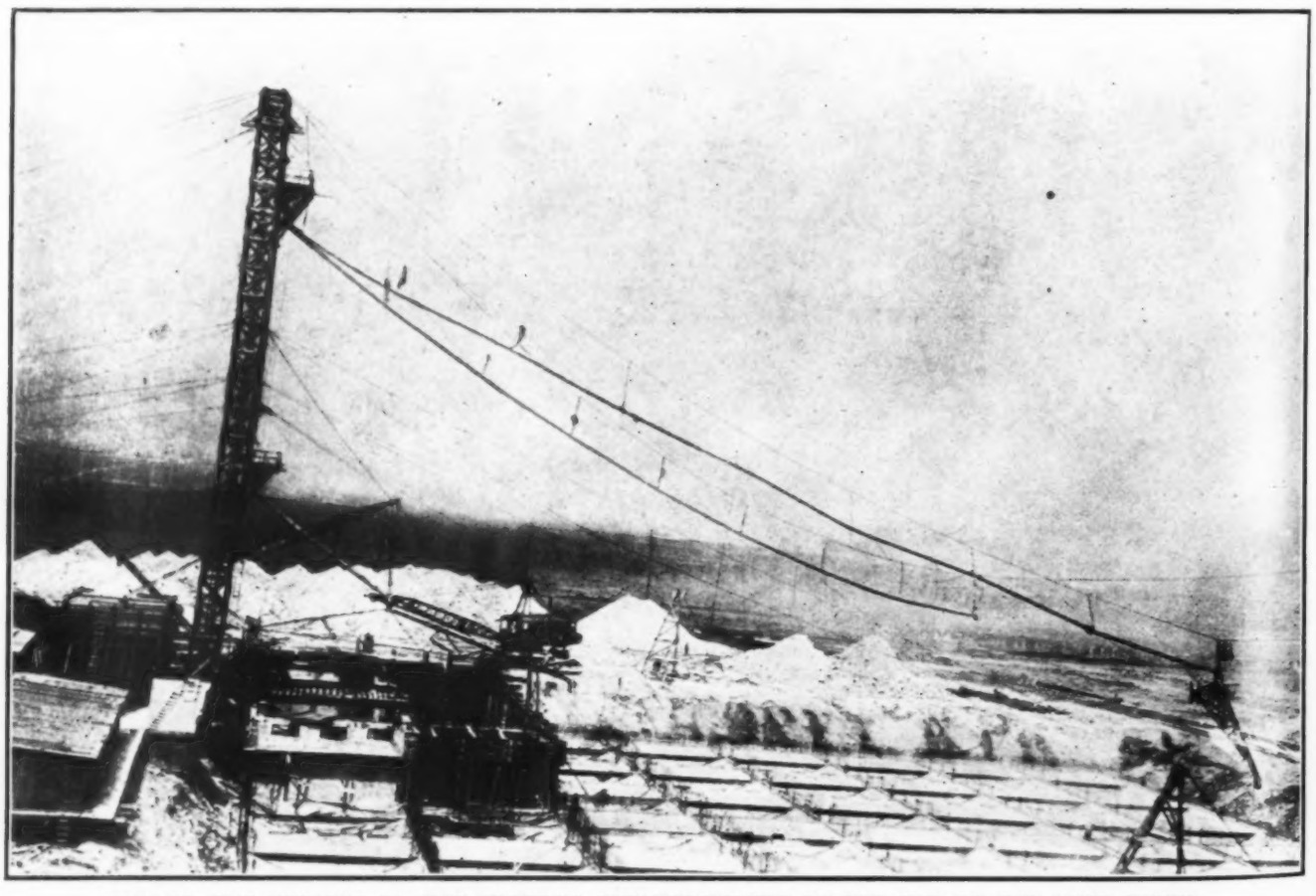
The sewage which will be treated by this plant is the dry weather flow from the area south of Eighty-seventh Street and from Blue Island to the State line. As the sewer system is of the combination storm and sanitary type, the storm weather flow will be allowed to pass directly without treatment into the Sag Canal, a channel cut to connect the Calumet River with the Drainage Canal. The dry weather flow only, which has a maximum of 200 cu. ft. per sec., will be brought to the Calumet Pumping Station by the intercepting sewer, now completed to 125th Street and there raised by pumps and sent to the new treatment works through a 5½-ft. and a 7½-ft. horseshoe concrete conduit built-in tunnel. After treatment it returns to the pumping station by another concrete conduit built integral with the first two mentioned, thence to the Sag Channel by a 16-ft. x 16-ft. horseshoe concrete tunnel.

The plant now being built consists of two duplicate units, each consisting of two batteries of 16 tanks and covering an area of 227 ft. x 297 ft. Between the units there will be drying beds to dry the sludge, which will be brought from the sludge hoppers by means of industrial cars.

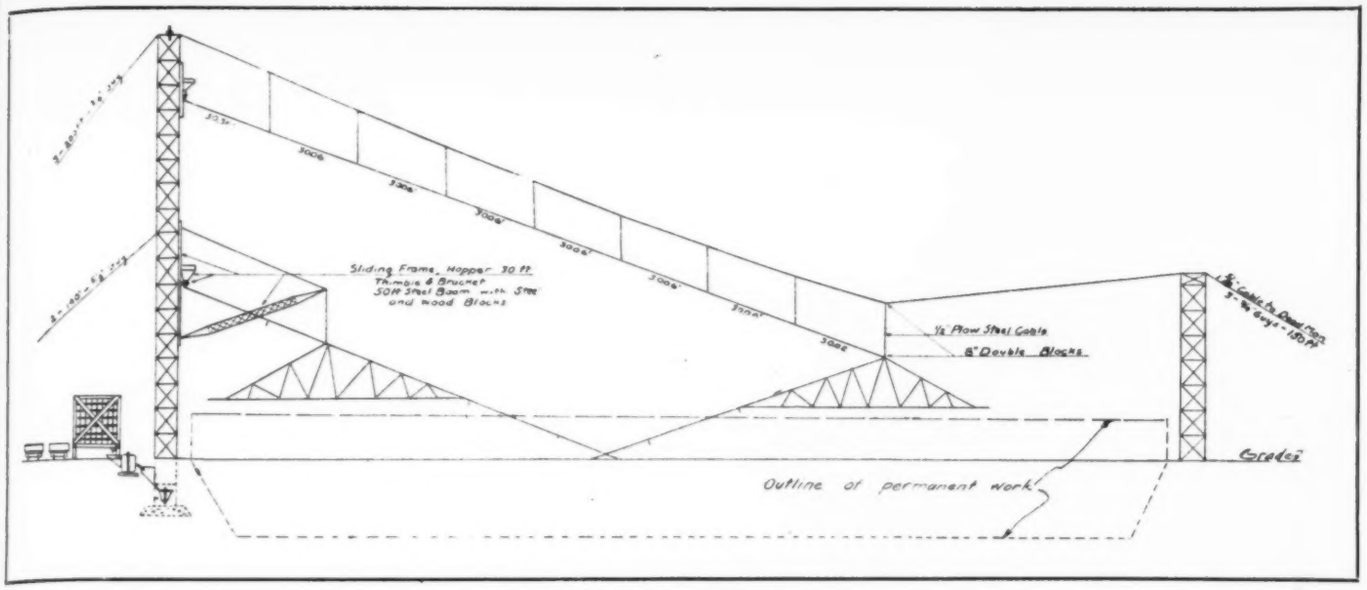
The structure containing 30,000 cu. yd. of concrete which may be considered as substructure, lends itself naturally to the use of chuting equipment, and the contractor has devised an unusual combination of line chutes and counterweights. An elevation of the chuting layout for one unit is shown on the opposite page. The chuting plant for one unit (the other unit has a duplicate plant) consists of a wooden tower 160 ft. high, carrying two lines of chutes (240 ft.), with a 50-ft. counter weight on the end of each. In addition the tower carries a steel boom with counterweight, as shown in the illustration.

Sand and gravel are received in standard gage cars and unloaded by a locomotive crane operating a clamshell into a 200-yd. capacity 3-compartment bin. One compartment is for sand and the other two for different grades of gravel. The material flows by gravity into a 1-yd. motor-driven mixer, and after revolving 1 minute the aggregate is dumped into a steel auxiliary hopper and from this hopper into the elevator bucket. The auxiliary hopper eliminates delays in charging the hoist bucket and has proved a distinct advantage.

To set the forms and to place the reinforcing, of



ONE OF THE CHUTING PLANTS SHOWING COUNTERWEIGHT ON THE END OF THE LONG CHUTE.

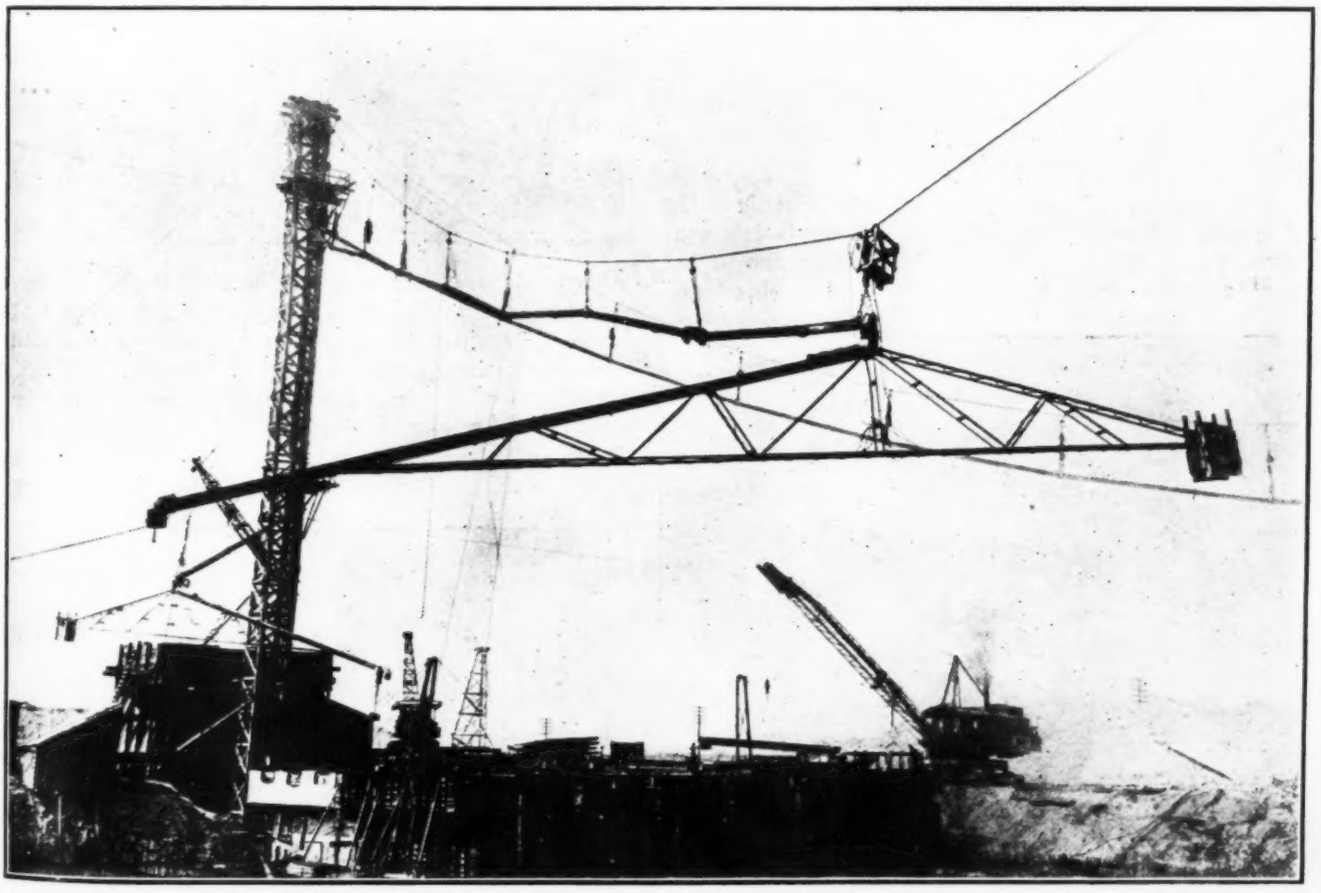


ELEVATION OF CHUTING UNIT

which there are 1500 tons, a dragline and crane are used, the crane handling parts out of reach of the dragline and running out on temporary runways of I-beams. One of the photographs shows the crane working and the dragline placing one of the I-beam runways. The reinforcing for the main and baffle walls are made up in mats in panels of convenient size and lowered into the forms in a similar manner.

The 150,000 cu. yd. of excavated material was removed from the site in 12-yd. dump cars of standard gage to a location at the north end of the property where an area of 200 ft. x 1300 ft. had been set aside for that purpose.

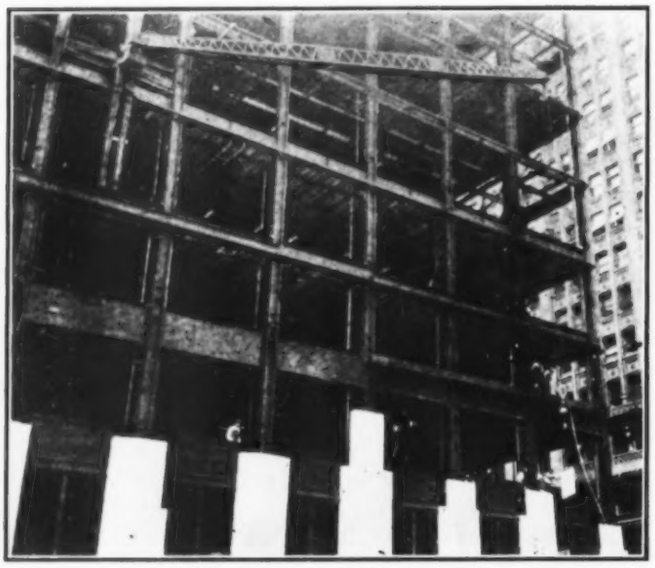
The contract was let in October, 1920, and the work is now about 35 per cent completed. The date of completion is set for December, 1922. The design was made by the Sanitary District of Chicago, of which Albert W. Dilling is chief engineer and Langdon Pearse, sanitary engineer. Ralph H. Barker is engineer in charge for the district.



A CLOSEUP OF THE STEEL BOOM WHICH CARRIES THE COUNTERWEIGHT. THE OPERATION OF PLACING THE FORMS IS GOING ON IN THE BACKGROUND.

PUTTING UP A FRONT

IN spite of the assurances that the many and varied troubles confronting the contractor in the Chicago district have laid the construction business low, the accompanying illustration, recently taken, would seem



to indicate that it is still alive. The photograph shows the stone facing going up on the La Salle Street side of the new Federal Reserve Bank, which is being built by the John Griffiths & Sons Co. at La Salle and Jackson streets. Note the almost horizontal position of the boom and the manner in which the mast is secured to the steel framework.

TRACTOR DRIVES CONCRETE MIXER

By J. H. Williams

AN accident to a ¾-yd. concrete mixer on the Chas. H. Fry Construction Company's job near Erie, Pa., resulted in considerable misfortune to the engine. The crankshaft, flywheel and engine base,

however, remained in good working order. The mixer itself, though not damaged, was useless without the engine to drive it. The job was a big one and the delay serious.

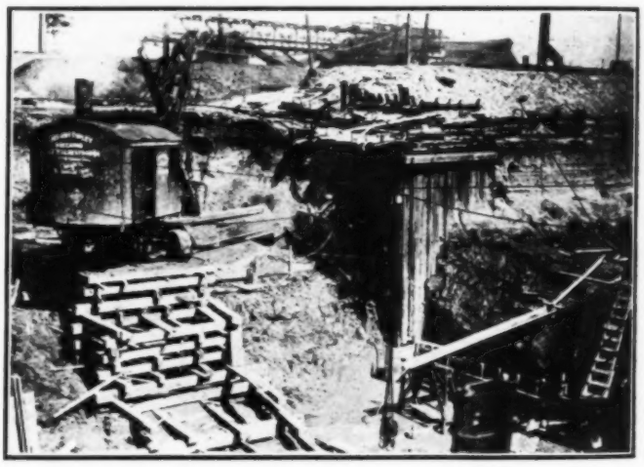
Undaunted by what seemed to be a serious obstacle, the superintendent connected a small tractor to the flywheel of the engine by means of a belt. After correcting the gear ratio between the drive pinion on the improvised jackshaft through to the mixer, operation was resumed. So satisfactory did the new arrangement work that the rest of the contract was completed without making permanent repairs to the mixer. It is believed that this is the first time a concrete mixer has been operated in this manner.

AIR HAMMER SPADES

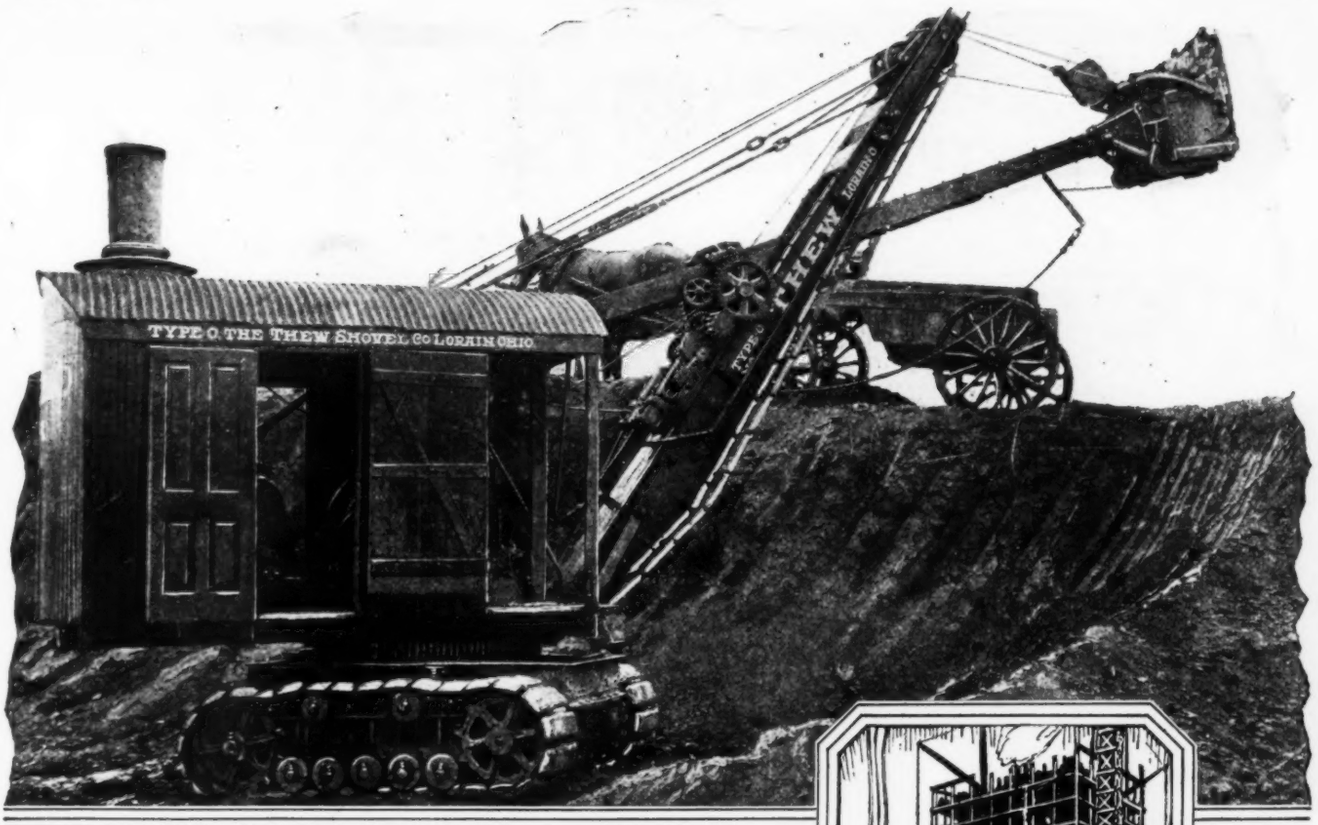
ON various jobs in Chicago the air hammer spade has been used with success to dress up the excavation to exact alignment after the main work of excavating had been roughed out by means of steam shovels or draglines. Where the bottoms or sides of pits are to have an unusual shape or one difficult for a power shovel to cut, these air hammer spades working with compressed air furnished by a portable compressor are a great labor saver.

STEAM SHOVEL STUNTS

"WE Move the Earth," is the slogan of the Herbert Ripley Wrecking & Excavating Co. of Chicago and the accompanying photographs of



their work taken recently on Chicago jobs would seem to back up this claim. The upper picture shows the manner in which the shovel is cribbed out of a deep completed excavation. Another way of getting a shovel out of the hole into which it has dug itself is shown in the lower photograph. In this case one of the Ripley shovels is climbing up an incline under its own power.



action

THE shovel on this job kept 36 mule teams busy.

The contractor says, "The job was completed in less than fifteen working days. The yardage, estimated between 11,000-12,000 cubic yards, an average of 750 cubic yards per 10 hour day."

When you are up against a rush job like this you can always get action with a Thew.

Write us about YOUR shovel.

THE THEW SHOVEL COMPANY
LORAIN, OHIO

ALLIED MACHINERY COMPANY OF AMERICA

Thew Power Shovels

THIS GROUP OF PICTURES ILLUSTRATES THE TRIUMPH OF THE WESTERN MACHINE-OUTFIT

No. 1 — A Western Standard Elevating Grader, drawn by a 10-ton tractor loading Western Dump Wagon and moving 1100 cubic yards a day in railroad yard grading.

No. 2 — A Western Wagon at the dump about to discharge its load. In such work a dump wagon must be both strong and easy on the stock like the Western.

No. 3 — A 3,400 yd. cut, taken out in three days by a Western Elevating Grader equipped with a special 40-inch carrier. The picture shows the superior character of its work. That grader cut through four to six inches of frost.

Western

THE WESTERN ELEVATING GRADER is pre-eminently a tractor-grader, giving results according to the power in front of it.

Do you want big yardage? Then give it the power; it is strong enough for the most powerful tractor.

Are you content with the smaller yardage of ordinary machines? Then don't plow so deep and you can get along with less power; BUT—the extra yardage resulting from extra power will be the cheapest dirt you ever moved.

Write for our catalog SM

Western Wheeled Scraper Company

Earth and Stone Handling Equipment

Aurora, Illinois, U. S. A.

Founded 1877

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Sterling Wheelbarrows

No. 16
For Concrete or Mortar

An Actual Occurrence - -

as related by the superintendent on a Milwaukee paving job – –

It was one of those hot days last summer - - A fight started among the laborers – – a regular fight, too – – Riot call turned in – – What was it all about? – – Wheelbarrows.

This contractor had made the mistake of mixing his breeds of wheelbarrows – – and the men *fought for the Sterlings.*

Why?

Because Sterling Barrows wheel easier, and balance the load over the wheel, instead of on the poor cuss between the handles.

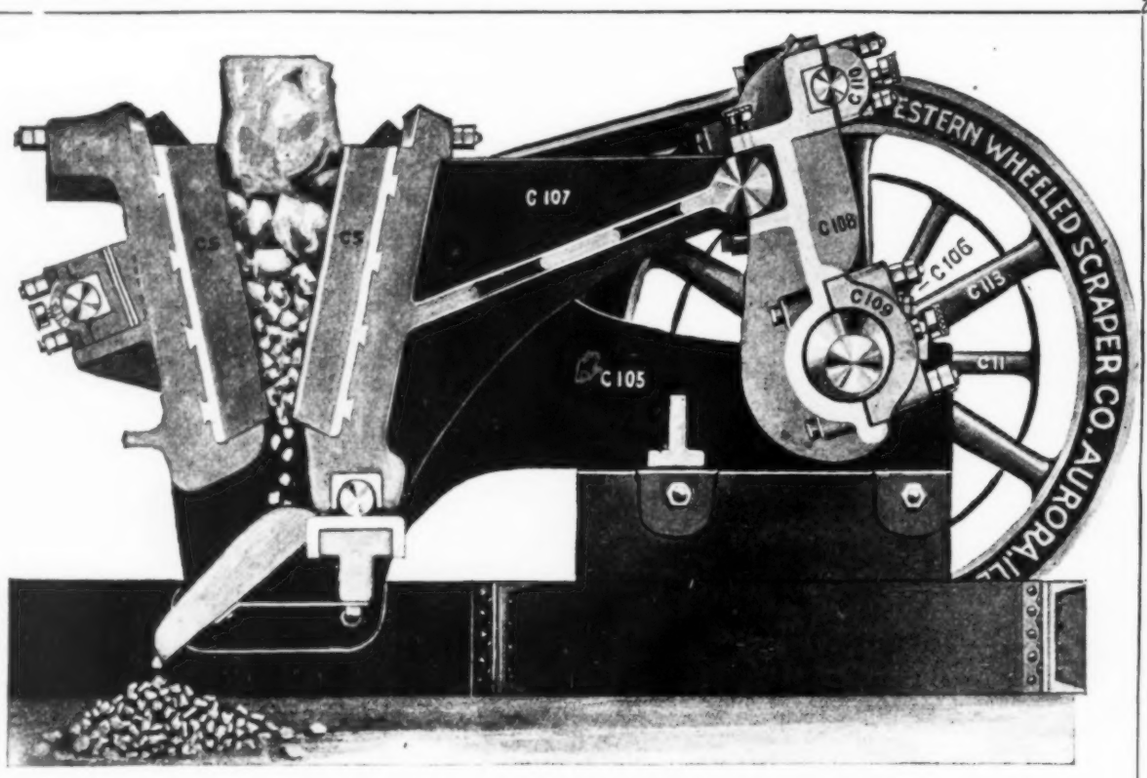
INTERCHANGEABLE PARTS—Altho the Sterling line comprises over 65 different styles—a style for every contractor's purpose—they are so standardized that all parts are interchangeable. Any tray will fit any frame. All wheels are the same, all legs are the same.

Consider what this means in convenience in ordering repairs. FIGURE the saving in salvage,—making new ones out of old ones. You get the utmost wear out of every single part.

Sterling Wheelbarrow Company, Milwaukee, Wisconsin

NEW YORK—30 Church St. CHICAGO—30 So. Jefferson St. DETROIT—18 Columbia St. CLEVELAND—422 Frankfort Ave.

Sales outside of the United States and Canada handled exclusively by ALLIED CONSTRUCTION MACHINERY ALLIED CORPORATION, New York, U.S.A.

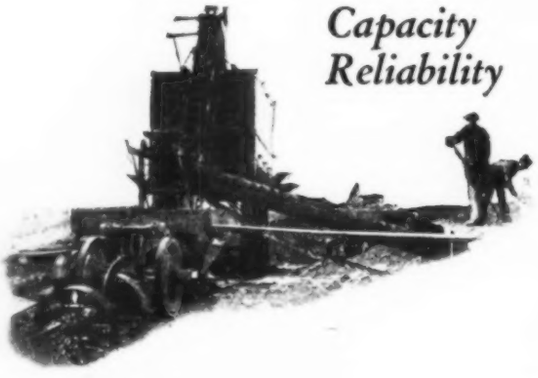


A crusher is "only a crusher" UNLESS
it's a WESTERN-AURORA

The Jaw Crusher that is Different

because of its two-blow stroke which increases production, consumes less power and reduces vibration (wear and tear). ¶ The Jaw Crusher with neither springs to break nor toggle to drop out. ¶ This unique and at the same time sturdy construction is responsible for the Aurora Crusher's Leadership in

Capacity *Simplicity* *Efficiency*
Reliability *Durability* *Economy*



Here is a complete and most efficient screening and crushing plant: Gravel feeder, grizzly to divert small material to the screen without going through the crusher; elevator, screen and portable bin —all of the most substantial construction.

Crusher Catalog X tells the whole story. WRITE FOR YOUR COPY TODAY.

THE AUSTIN-WESTERN ROAD MACHINERY CO. CHICAGO

The Austin-Western Road Machinery Co. · *Chicago, Ill.*

"Everything from a Drag Scraper to a Road Roller"

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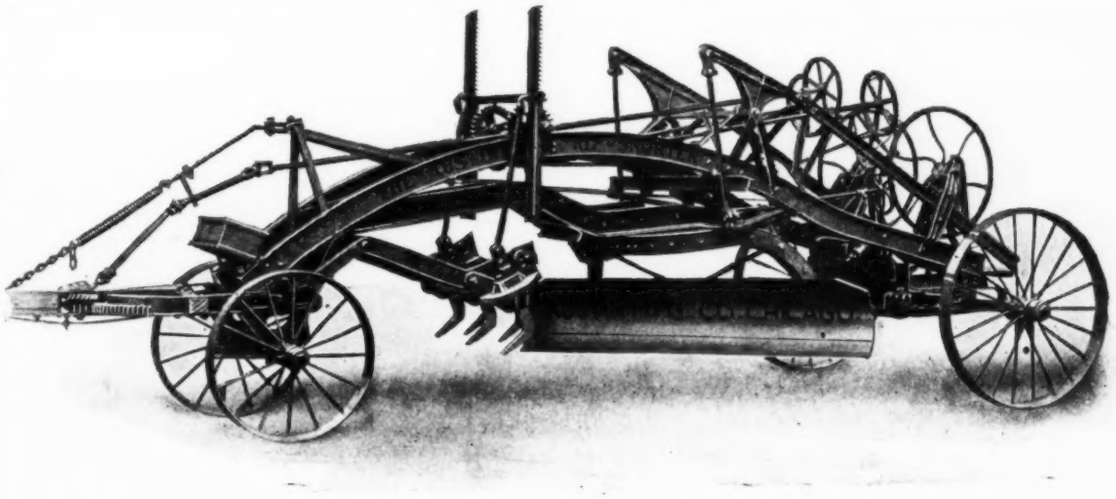

It's Good for what Ails your Roads

Take a scarifier that does not turn up its teeth at the hardest surface, add a grader blade directly behind it to finish the job in one operation, put both on a grader frame strong enough to stand the gaff—and you have

The Austin Rip Snorter

Improved roads that have gone to the bad are a nightmare to travelers and a tough problem for those charged with keeping them in repair. ¶No lasting good will result unless these worn-out ravelled and pot-holed roads are first scarified, then graded and finally rolled—a lengthy and expensive job if each operation is done separately. ¶The Rip Snorter is the ideal machine for such work. It scarifies and grades at the same time, saving time, labor and expense. ¶Many other uses are constantly being found for the Rip Snorter. For instance, it is A-1 for removing an old road surface preparatory to laying a more improved type. The old material is scarified and piled along the roadsides where it can be used to form the shoulders of the new road, or if this is not desirable, it can be easily loaded into wagons.

SPECIAL RIP SNORTER BUL LETIN X should be in your files.

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THE AUSTIN-WESTERN ROAD MACHINERY CO. CHICAGO

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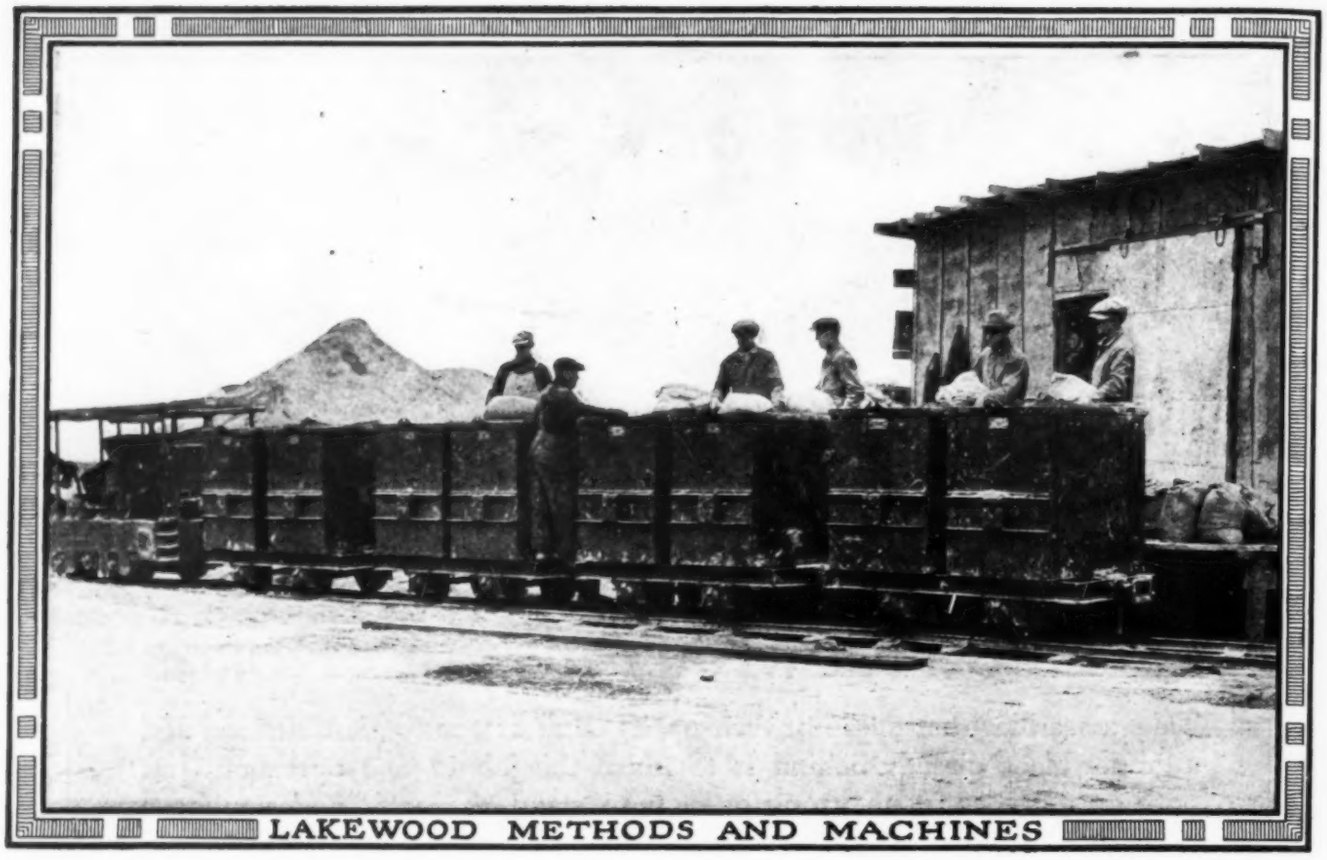
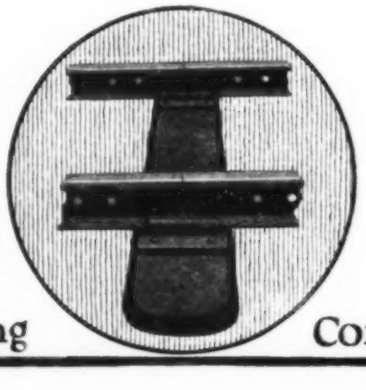


For These Three Reasons You'll Like Lakewood Batch Boxes

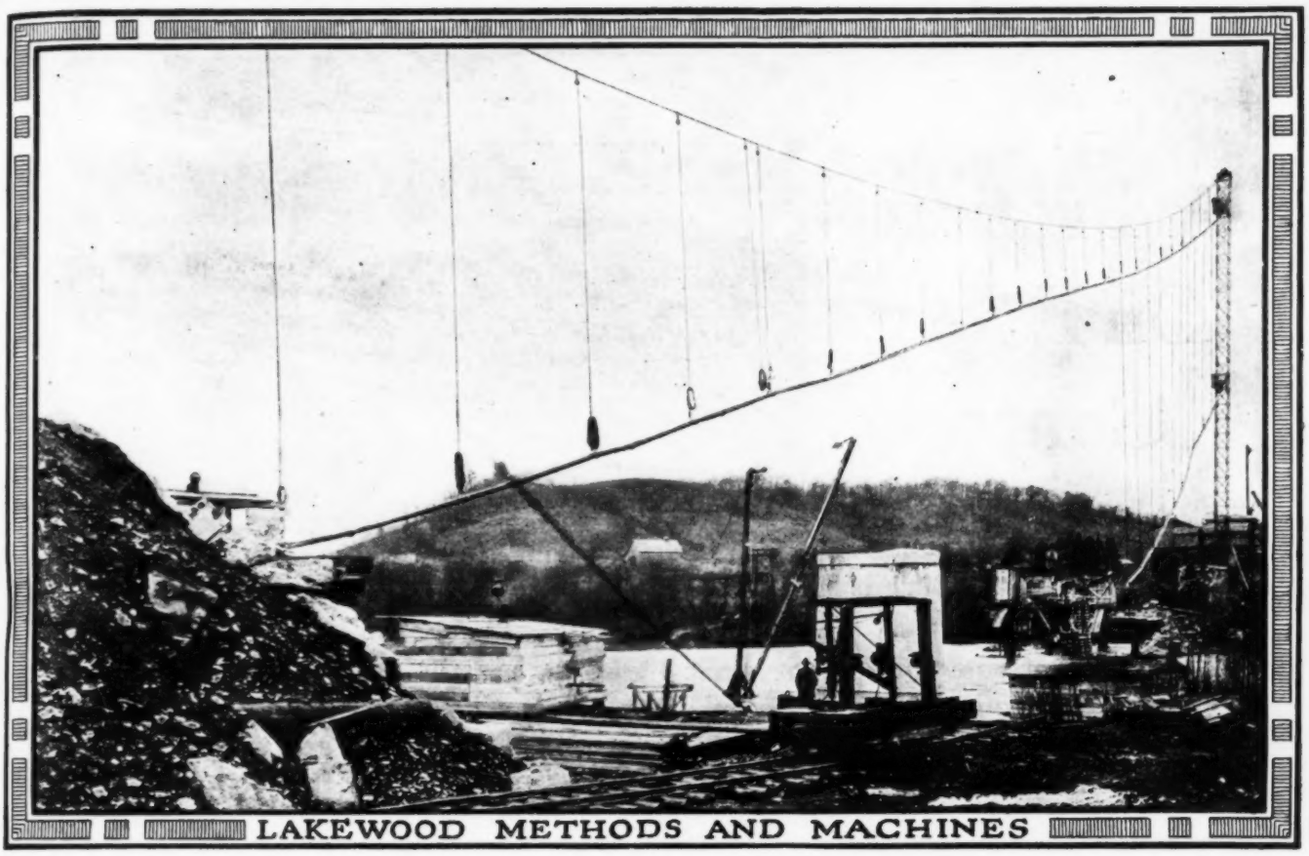
The three outstanding features of Lakewood Batch Boxes are:

1. Heavy steel body, reinforced and riveted to stand rough handling and long service. Nothing to go wrong.
2. Trunnions may be raised or lowered for different volumes of batch, so that easy dumping is always assured.
3. Separate water- and wind-tight compartment. Keeps cement dry and prevents any blowing away.

The popularity of Lakewood Batch Boxes is evidenced by nearly 3000 in use. *You'll* like Lakewood Batch Boxes—let us show you why.



The Lakewood Engineering Company, Cleveland U.S.A.

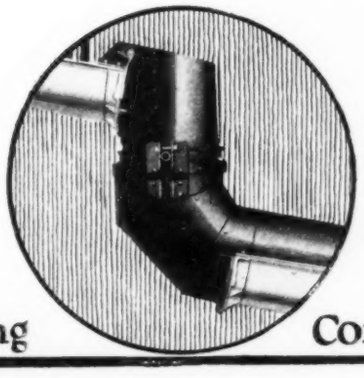


Over 700 Ft. of Lakewood Continuous Line Chute

The continuous chute line used by the Vang Construction Co. on bridge work at Lawrenceburg, Ind., was over 700 ft. long.

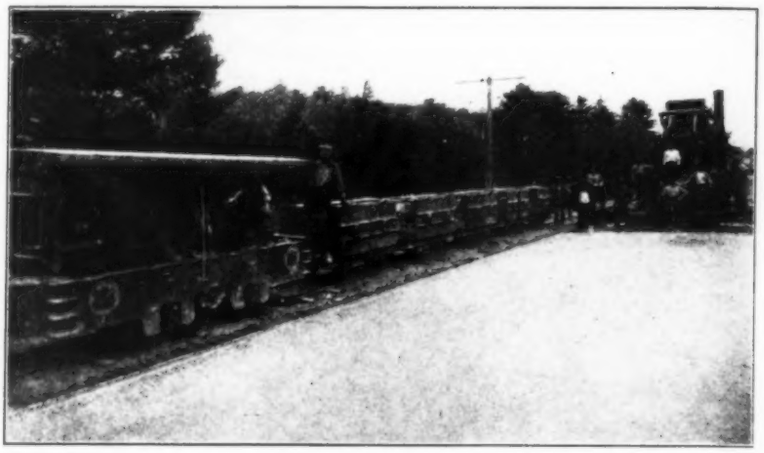
Lakewood continuous line chute connections give the flexibility necessary for a chute line of such length. The full circle shape of the chutes gives maximum capacity.

Whether your job requires continuous line chuting, counterweight plants, unit plants or steel towers, Lakewood concrete placing equipment fulfills all your requirements. Write for Bulletins.



The Lakewood Engineering Company, Cleveland U.S.A.

Insure A Profit On Every Contract



To finish every contract with a profit and on time you must have dependable equipment.

If any part of your equipment is not capable of giving good service day after day, the whole job is held up while repairs are made and these waits cost real money.

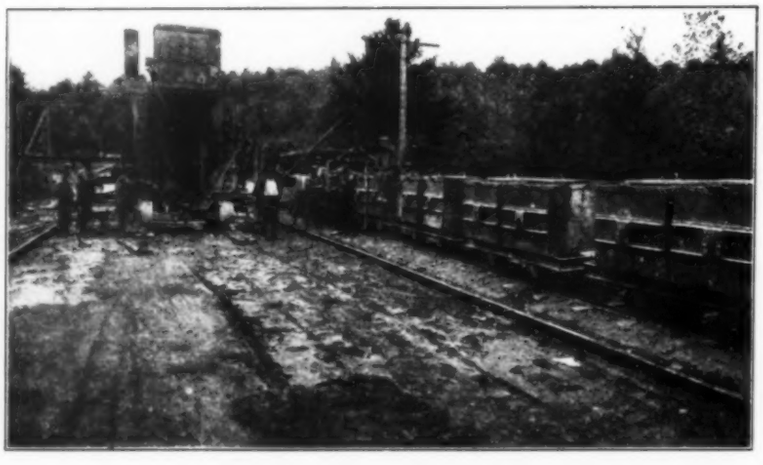
The men responsible for the success of the Pottsville Construction Company evidently understand the true economy of dependable equipment. They are using on the road from Middleport to Tamaqua, Pa., paving machines, finishing machines, Hyatt equipped locomotives and Hyatt equipped cars, all built by the Lakewood Engineering Company.

Hyatt roller bearings with their inbuilt durability are logical parts of dependable cars and locomotives. Their sturdy steel rollers provide a true rolling motion, eliminating the rubbing, wearing friction of plain bearings. With this friction removed the cars move easier (50% easier on the level) and the bearings last without adjustment or replacements throughout the life of the cars or locomotives.

One greasing each season is all the attention Hyatt bearing locomotives and cars need.

Prevent every chance of hold up of work due to flimsy equipment—specify Hyatt equipped cars, locomotives and mixers.

Hyatt Roller Bearing Company, New York, N.Y.



Use Durable Dependable Equipment

To End Bearing Trouble
In Your Road Engines

All Farquhar Engines are now made with *perfectly round* crankshafts—round not only to the naked eye, but under micrometer measurements.

Mark this well! It's the means of practically eliminating bearing trouble. Here, at last, is an end to so many cases of hot bearings in a road engine.

Crankshafts Absolutely Accurate

The ordinary method of finishing a crankshaft is to put a finishing cut on with the lathe, then to file it smooth by hand. This looks fine to the naked eye—but it's not accurate—it isn't humanly possible. It's the old story—"Machine vs. Man." Farquhar has spent thousands upon thousands of dollars to perfect the crankshaft—to end the troubles faulty crankshafts bring.

This Costly Process Your Protection

Farquhar *Steam* Road Engines are built to give you service. This method of finishing crankshafts is but one detail of construction, but a mighty important detail from the point of service you get. Ask for all the facts on Farquhar Steam Road Engines.

A. B. FARQUHAR COMPANY, Ltd. Box 278, York, Pa.

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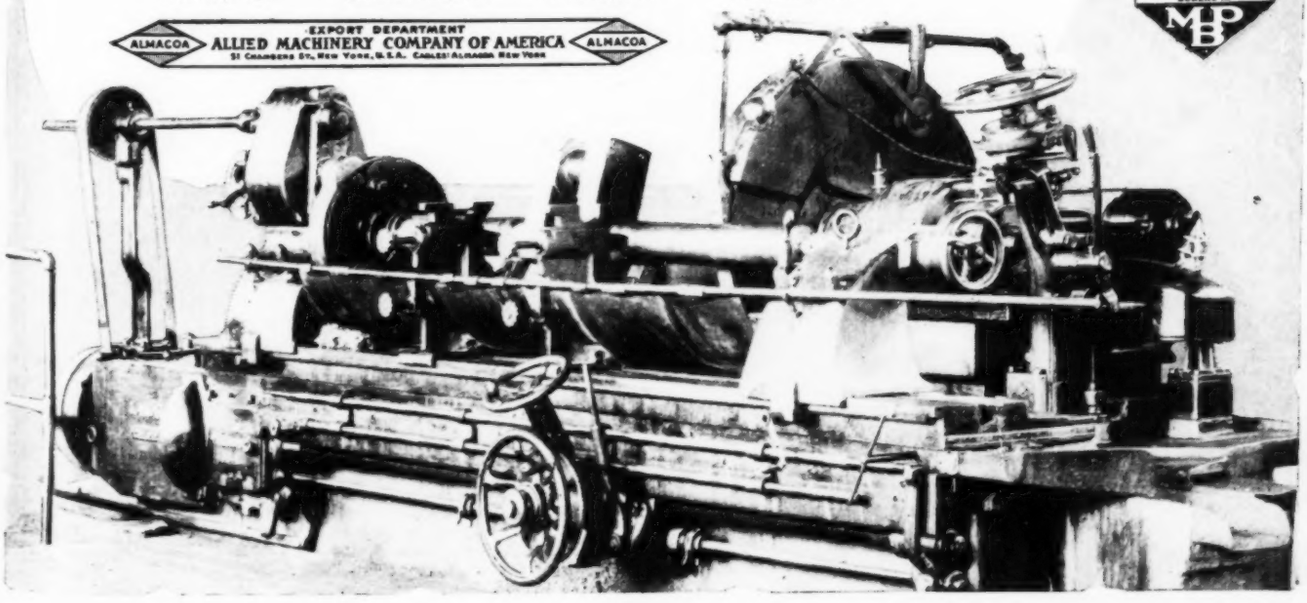

B-G Loaders Work for Road Contractors

Crawlers have been used on all B-G Loaders for nearly two years. No experiment.

Ability to accommodate themselves easily to any change in the material-handling system has made B-G Loaders increasingly popular with road contractors.

In Wisconsin the McGucken Construction Co. are using two B-G Loaders on the Town Line Road, Walworth County, one handling sand and the other stone. Since beginning the job, a change in supply made it necessary to change the method of handling the sand and gravel.

B-G Loaders accommodated themselves readily to this change.

At the beginning of the job, sand and gravel were produced at a local pit and stored in large piles on the highway at intervals of 2000 feet. Then the run of material at the pit changed, becoming unfit for use, and sand and gravel had to be brought in from outside. This was piled on the subgrade and at convenient cross-road intersections. B-G Loaders then worked equally as well on the subgrade as at the larger piles.

This case is typical. B-G Loaders mounted on crawlers can go anywhere, and the patented feeding discs will feed the buckets well at either a large or small material pile.

Barber-Greene Company
AURORA, ILLINOIS, U. S. A.

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New York, Utica, Philadelphia, Norfolk, Worcester, Buffalo, Cleveland, Detroit, Indianapolis, Pittsburgh, Chicago, Milwaukee, Minneapolis, St. Louis, Des Moines, Kansas City, Omaha, Denver, Salt Lake City, Portland, Seattle, Los Angeles, San Francisco

Canadian Agents: Mussens Limited, Montreal, Winnipeg, Toronto, Vancouver

Export Dept.: Allied Machinery Company of America, 51 Chambers Street, New York City.

Patented feeding discs eliminate shovelers. Absolutely safe. Used on all B-G Loaders for five years. No experiment.

B-G Loaders Work for Counties

Counties and Highway Districts are finding that B-G Loaders cut down their day-labor costs appreciably. Many Loaders have been sold this year to replace shovelers at the sand and gravel piles in many counties.

Winnebago County, Wisconsin, noted for their success on the Neenah-Oshkosh road in 1920, are using a B-G Loader this year to load both sand and gravel. The illustrations above show the Loader working on both materials.

Below is a partial list of counties and municipalities that have purchased B-G Loaders this year:

Tippecanoe County, Ind.; Conejos County, Col.; Burley Highway District, Burley, Idaho; City of Old Town, Maine; County of Cowlitz, Wash.; County Board, Ashland, Wis.; Government of Vancouver; Salt Lake County, Utah.

The Kane County Commissioners have used a B-G Loader with satisfactory results loading trucks directly from the bank in all of their numerous pits. Last year the Twin Falls, Idaho, Highway District used a B-G Loader to load trucks with crushed lava rock. Mr. W. L. Johnson, road director, estimates that to load this hard flinty material as fast as the B-G Loader did it, 20 men would have been required.

Barber-Greene Company

AURORA, ILLINOIS, U. S. A.

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New York	Worcester	Detroit	Chicago	St. Louis	Omaha	Portland
Utica	Buffalo	Indianapolis	Milwaukee	Des Moines	Denver	Seattle
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Norfolk						San Francisco

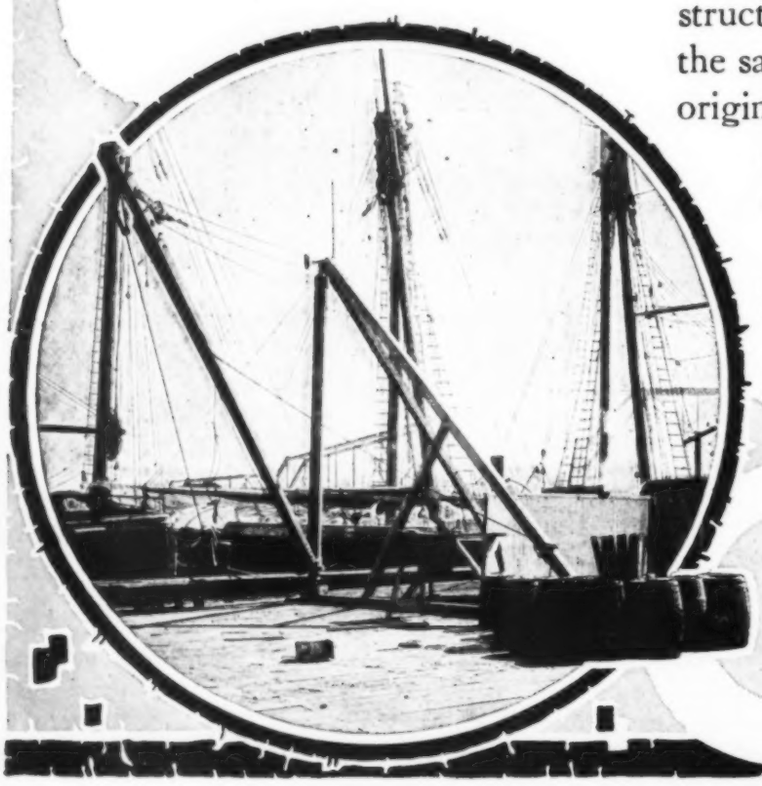
Canadian Agents: Mussens Limited, Montreal, Winnipeg, Toronto, Vancouver

Export Dept.: Allied Machinery Company of America, 51 Chambers Street, New York City.

ECONOMY

Next to reliability and strength, the dominating factor in the purchase of any kind of machinery is economy of operation. This feature has been given special attention by Clyde engineers. Based upon results obtained, costs are remarkably low.

In the illustration herewith is shown a half hand power stiff leg derrick, used by the New York Oil Storage and Transfer Co. at Bayway, N. J. A single drum hand power is used for handling the boom lines, while the hoisting of loads is done with a single drum gasoline engine. This installation handles the unloading of oil carrying vessels at the docks.



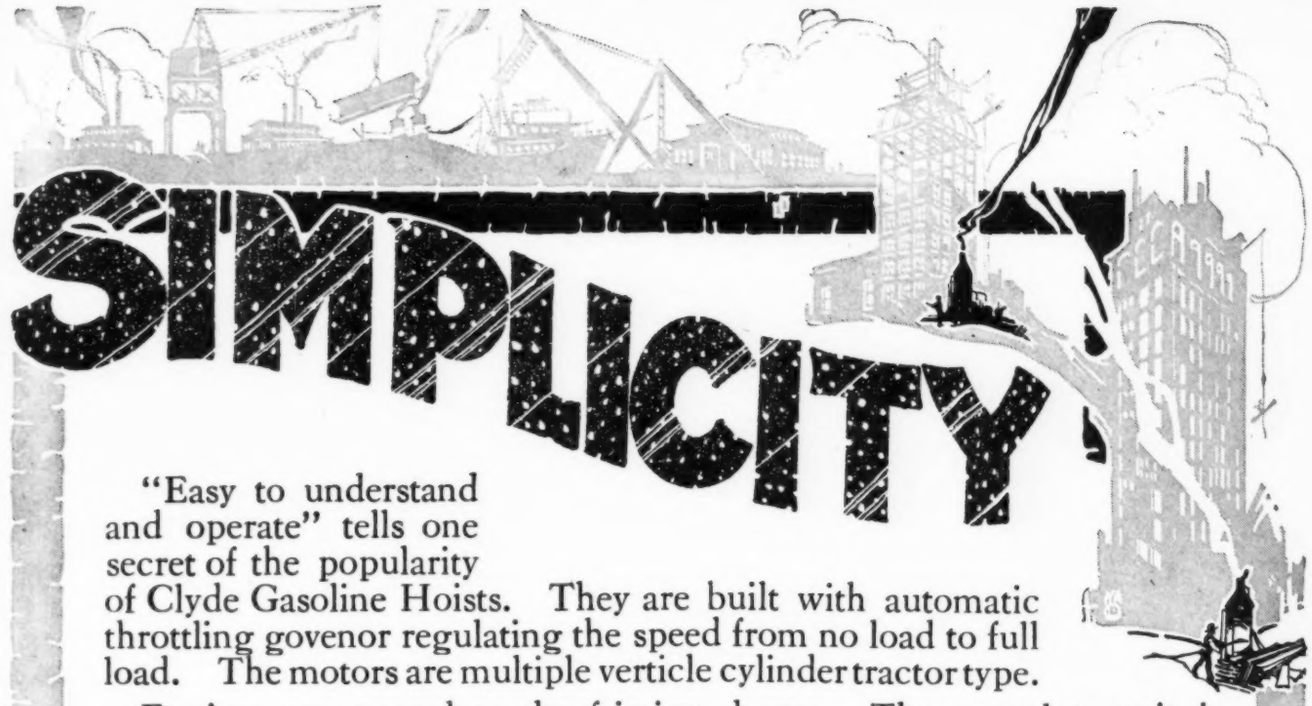
The same careful study of construction details is maintained and the same Clyde guarantee against original defects applies to machinery of this nature as covers the balance of the Clyde line.

Bulletin U will give you complete details of the Clyde line of derricks. It will be mailed on request.

Clyde

THE CLYDE LINE

Steam Hoists Electric Hoists Gasoline Hoists Belt Hoists Derrick Fittings
Steel Derricks Excavators Traction Cranes Blocks and Sheaves Logging Machinery



SIMPLICITY

"Easy to understand and operate" tells one secret of the popularity of Clyde Gasoline Hoists. They are built with automatic throttling govenor regulating the speed from no load to full load. The motors are multiple verticle cylinder tractor type.

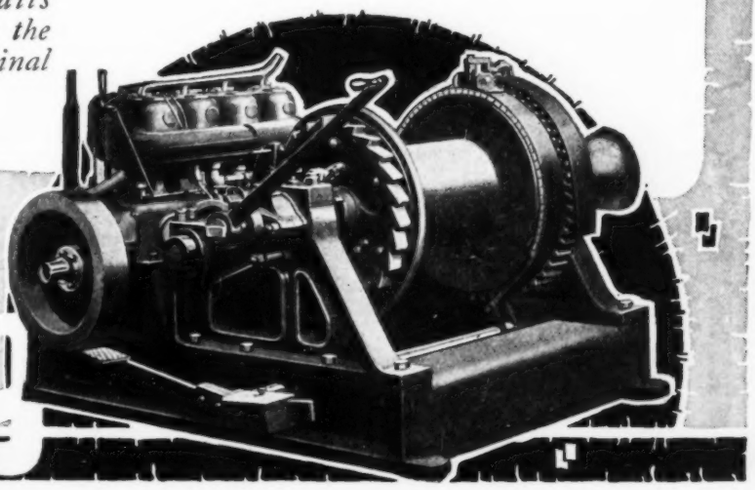
Engines are geared to the friction drums. The complete unit is mounted on a cast bed plate.

All gas engines are equipped with high tension magneto, force feed lubricator, water pumps, fuel tank and all necessary tools ready for operation.

Gasoline hoists of forty-five horse power or over are fitted with free engine clutch.

Bulletin T contains full information on one, two and three drum gasoline hoists for general uses together with others built for specific purposes. You may get your copy from the nearest branch office or from the factory.

Clyde standard quality prevails throughout the entire line as does the usual Clyde guarantee against original defects.



Quality

CLYDE IRON WORKS SALES COMPANY

DULUTH, MINN., U. S. A.

Sole Distributors for Clyde Iron Works

Branch Offices and Warehouses:

NEW YORK 141-149 Centre St. | NEW ORLEANS 309 Magazine St. | SEATTLE 542 First Ave. So. | CHICAGO 11 So. LaSalle St. | JACKSONVILLE 507 Hill Bldg. | PORTLAND 18th and Upshur Sts.

WILLIAMSPORT PURPLE STRAND

—*for Hard Service*

The stress, the strain, wear, tear and usual severe service in logging operations call for wire rope of a very unusual nature.

Williamsport Purple Strand is built to give the utmost in wire rope service, the wire is drawn in our own plant from specially treated rods of exceptional toughness, and before it is accepted for Purple Strand it must pass the severest tests known to the wire rope industry.

Operators who must have a super-quality wire rope will insist upon Williamsport Purple Strand after they have once tried it.

Send for Purple Strand pamphlet 36

WILLIAMSPORT WIRE ROPE COMPANY

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OUR Detroit Agent wrote in, "Do you notice that we are ordering different kinds of shovels and scoops these days? The reason is we are going after Contractors almost altogether and find them very ready to buy the best shovels and picks they can get."

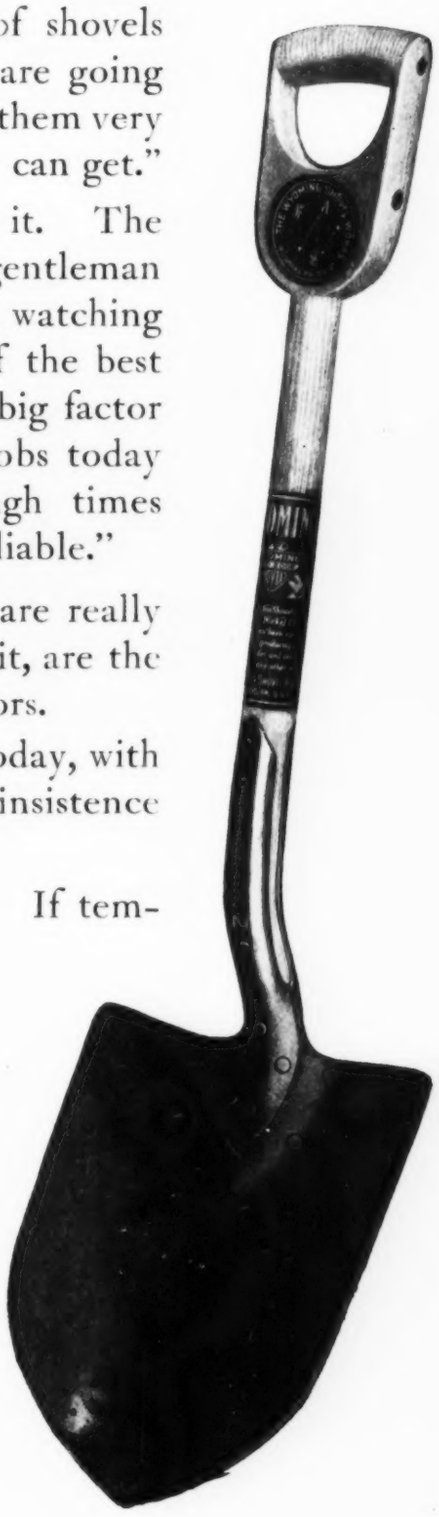
"Sure," we told Detroit, "we had noticed it. The Contractor—the real Contractor is a wise gentleman and knows that today profits will come from watching the corners, therefore, his equipment is of the best throughout. Equipment performance is the big factor with him. Further the Contractors with jobs today are the survival of the fittest. The tough times cleaned out most of the slip-shod and unreliable."

The fact that Red Edge Shovels and Picks are really better, and the Contractors of today know it, are the reasons we are selling so many to Contractors.

Then, it is so much easier to get Red Edge today, with our wide distributing connections and our insistence that stocks be always complete.

Hard times haven't affected us very much. If temporarily some of our good customers can't buy shovels and picks there are always people somewhere ready to buy Red Edge.

When the time comes again that all of our customers are buying, we certainly will have to build another factory.



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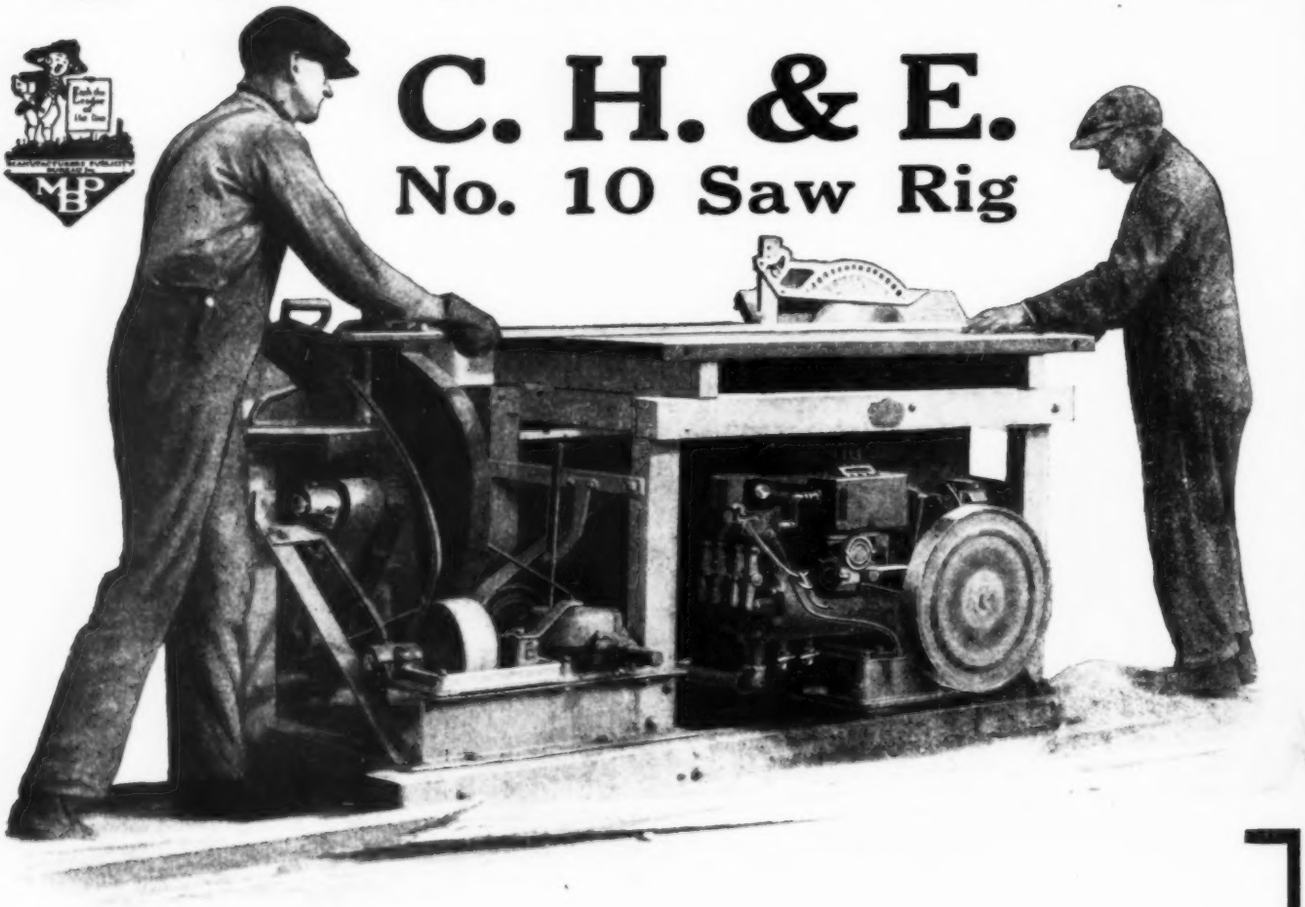
On the Job

C. H. & E. No. 10 Saw Rig



WHY pay carpenters the present high wages to saw all your lumber when a Power Saw will do the work right on the job at but a fraction of the cost?

One of the country's largest contractors recently wrote that they had suffered a great loss of time and much inconvenience on one of their jobs because of the absence of a Saw Rig—and this experience is typical of hundreds of others.

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Write for the C. H. & E. Catalogs describing eight different sizes of Saw Rigs, Power Driven Pumps, Hoists, Mortar Mixers, Elevators, Engines.

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